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See also back page

1 P 127
Symbiosis in yoghurt (1). Stimulation of Lactobacillus bulgaricus by a factor produced by Streptococcus thermophilus.
Galesloot, Th. E.; Hassing, F.; Veringa, H. A.
Netherlands Milk and Dairy Journal 22 (1/2) 50-63 (1968) [9 ref. En] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

Stimulation of L. bulgaricus by Str. thermophilus was shown to be due to a factor similar to and replaceable by formic acid. When milk was heated intensely (99°C for 30 min or 130°C for 10 sec) formic acid was produced and the stimulant was not required by L. bulgaricus, but the heat treatment of milk for yoghurt manufacture (85-90°C min) was not severe enough to produce acid. The stimulant was produced by Str. philus only under anaerobic conditions. CDA

2 P 167
[Production of sweet-cream butter with lactic flavour.]
Poyarkova, G. S.; Chuzhova, Z. P.; Sidorova, E. A.; Makar'ina, N. V.; Fursova, S. A.
Molochnaya Promyshlennost' 29 (10) 19-20 (1968) [Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, USSR]

A study was made of the feasibility of improving the flavour of Meleshin butter by adding to the high-fat cream 2 or 3% of aroma-producing Streptococcus diacetilactis cultures; butter made without culture addition served as control. When tested fresh, all the butters were of high quality, but the experimental butters had a more pronounced flavour and were given higher scores. After 3 months' storage at 0-5°C, the quality of the butters declined slightly. In the experimental butters the diacetyl content increased during storage, reaching a max. of 0.201 mg % at 3 months. Other values for this butter at 3 months were: acetoin, 0.435 mg %; esters, 2.342 mg %; and plasma pH, 6.46; control butters contained no diacetyl or acetoin. It is concluded that in butter manufacture during the winter the addition of aroma-producing cultures improves the butter quality without impairing its storage life. FL

2 P 175
[Study of fermentation in model cheeses of different lactose content.] Gärversuche mit Modellkäsen unterschiedlichen Lactosegehaltes.
Steffen, C.
Verpackung 94 (75) Wiss. Beil. Nr. 118: 991-93 (1968) [3 ref. De, fr, en] [Milchtechnisches Institut ETH, Zürich, Switzerland]

Emmental-type cheeses, weighing ~600 g were made from raw milk + (i) mixed culture of (ii) Streptococcus thermophilus and (iii) Lactobacillus helveticus or from pasteurized milk + (ii) or (iii). 0-8% lactose was added to the milk, and lactic acid (see preceding abstract) and lactose were determined in the cheeses at intervals during ripening for 48 h at 38°C. % lactic acid in DM of cheeses made with 8% added lactose were respectively at 0, 3, 6, 24 and 48 h: (i), 0.1, 0.24, 1.42, 4.35 and 4.94; (ii), 0.12, 0.33, 0.63, 1.42 and 1.74; (iii), 0.13, 0.18, 0.47, 3.46 and 5.78. For control cheeses the corresponding ranges were: 0.09 - 0.12, 0.23 - 0.58, 0.77 - 1.25, 1.20 - 2.01 and 1.52 - 2.07. For lactose the % were: (i), 6.03, 5.63, 3.93, 1.03 and 0.26; (ii), 6.88, 6.22, 5.60, 4.20 and 3.65; (iii), 6.98, 6.44, 5.74, 2.70 and 0.92. For control cheeses the % ranges were: 2.30 - 2.66, 1.60 - 1.73, 1.12 - 1.54, 0 and 0. SKK

2 P 206
[Industrial production of Bulgarian acidified milk.]
Girginov, T.
Khranitelna Promishlenost 17 (7) 36-37 (1968) [Bg] [VIKhVP, Plovdiv, Bulgaria]

Consumption of Bulgarian acidified milk, which is the product of lactic acid fermentation by Lactobacillus bulgaricus and Streptococcus thermophilus, is claimed to have very favourable effects on digestion, to destroy various harmful micro-organisms in the intestines, to promote health and prolong human life. Industrial production has lately been affected by the antibiotics added to cattle fodder or to the treatment of cows with penicillin, and also by the use of fertilizers, herbicides, insecticides and fungicides, which has resulted in deterioration of milk quality. These deficiencies are recorded and methods of preventing them suggested. STI

2 P 230
[The micro-organisms of the bifidus group (Lactobacillus bifidus). II. Technology of bifidus culture in the dairy plant.] Die Mikroorganismen der Bifidusgruppe (syn. Lactobacillus bifidus). 2. Mitteilung: Die Technologie der Bifiduskultur im milchverarbeitenden Betrieb.
Schuler-Malyoth, R.; Ruppert, A.; Müller, F.
Milchwissenschaft 23 (9) 554-58 (1968) [2 ref. De, en] [Med.-Diagnostisches Inst., Berg/Starnberg, W. Germany]

Detailed instructions are given for the use of a commercial mixed starter, containing L. bifidus, L. acidophilus and thermophilic streptococci, in the industrial manufacture of cultured milks, quarg, cheese (Bel Paese) and butter. Other applications, e.g. for culturing buttermilk from the Fritz process, are also mentioned. SKK

2 P 240
Metabolism of volatile compounds of Pediococcus cerevisiae and their occurrence in Cheddar cheese.
Keenan, T. W.; Parmelee, C. E.; Branen, A. L.
Journal of Dairy Science 51 (11) 1737-42 (1968) [22 ref. En] [Food Science Inst., Purdue Univ., Lafayette, Indiana, USA]

5 single strain cultures of Pediococcus cerevisiae were incubated in 11% SNF milk medium containing 0.1% yeast extract. Only small amounts of diacetyl were produced at 30°C, even when the medium was acidified after 48 h to pH ~4.7 with 20% H_3PO_4; max. level observed was 0.46 ppm. After incubation at 30°C for 48, 96 or 168 h or 10°C for 4 wk, levels of acetaldehyde and ethanol detected were ⩽1.5 ppm. All strains were able to reduce acetaldehyde and propionaldehyde to corresponding alcohols at both 10° and 30°C, but none were able to reduce butanone to 2-butanol or acetone to isopropanol. There was no evidence of lipolysis of butterfat or tributyrin or of proteolysis of milk protein by these organisms after 5 days at 30°C. Pediococci isolated from a number of Cheddar cheeses produced only small amounts of diacetyl. CDA

3 B 81
[Intensified production of cultured milk products.]
Maksimova, A. K.
Molochnaya Promyshlennost' 29 (9) 9-12 (1968) [3 ref. Ru] [Vsesoyuznyi Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

The proteolytic activity of various streptococci was studied as a step towards accelerating the production of cultured milk products. 11 of 21 cultures of Streptococcus lactis tested had high proteolytic activity (coagulation time for milk inoculated with 5% culture, 4-5.5 h; tyrosine released after 7 days, 369-430 g/ml whey). Corresponding figures for 2 other species with high proteolytic activity were: Str. acetoinicus, 9 of 15 cultures, 6.7-7 h, 302-348 μg; Str. cremoris, 16 of 37 cultures, 5-6 h, 372-498 μg. All 8 Str. diacetilactis and all 9 Str. paracitrovorus cultures had low proteolytic activity. A direct relationship was observed between rate of acid production and intensity of proteolytic activity in cultures of Str. lactis and Str. acetoinicus, but not in those of Str. cremoris. Tests on 24-h cultures (3%) of Str. lactis (strains 241, 202) and Lactobacillus helveticus (strain 188), inoculated into sterilized (10 min at 120°C) milk with added chalk, showed the amount of tyrosine released to be a satisfactory criterion for selection of strains with high proteolytic activity. HBr

3 B 103
[The micro-organisms of the bifidus group (Lactobacillus bifidus). III. Detection of L. bifidus in milk products.] Die Mikroorganismen der Bifidusgruppe (syn. Lactobacillus bifidus) 3. Mitteilung: Der Nachweis von Bifiduskeimen in Milcherzeugnissen.
Schuler [-Malyoth], R.
Milchwissenschaft 23 (10) 614-18 (1968) [12 ref. De, en] [Medizinisch-Diagnostisches Inst., Berg/Starnberg, W. Germany]

Microscopical, immunomicroscopical and immunofluorescence methods for detection of L. bifidus are outlined. In a cultural method, an inoculum of the milk product was incubated for 48 h at 37°C under strictly anaerobic conditions in Oxoid RCM medium, brought to pH with N HCl and then supplemented with 1.5% agar. L. bifidus grew as opaque, white, raised colonies 1-2 mm diam., growth of aerobic lactobacilli was largely inhibited, and streptococci appeared as small transparent colonies. It is stated that, using this method, L. bifidus can be detected in sample dilutions of up to 10^{-6}-10^{-8} for cultured milk, 10^{-5}-10^{-7} for quarg, up to 10^{-11} for cheese and 10^{-6}-10^{-7} for butter. Immunofluorescence is essential for final identification of L. bifidus, since the organism becomes progressively more O_2-tolerant on repeated passage through milk over a prolonged period. [See FSTA (1969) 1 2P230] SKK

3 B 116
The in vitro effect of citric acid and sodium citrate on Streptococcus agalactiae in milk.
Sinha, D. P.; Drury, A. R.; Conner, G. H.
Indian Veterinary Journal 45 (10) 805-10 (1968) [6 ref. En] [Dept. of Surgery and Med., St. Univ., East Lansing, Michigan, USA]

Growth of Str. agalactiae in commercial skim-milk and fresh milk was not inhibited by sodium citrate (0.1%-4%). Addition of citric acid (⩾0.8%) had a growth inhibiting affect similar to that observed in milk acidified to the same pH with HCl. Addition of $MgCl_2$ + 0.8% or 0.9% citric acid to the milk did not affect growth rate. EAW

3 G 91
Imitation-cheese spread based on peanut protein.
Krishnaswamy, M. A.; Patel, J. D.
Milchwissenschaft 23 (10) 618-23 (1968) [14 ref. En, de] [Central Food Technological Res. Inst., Mysore 2, India]

'Cheeses' made from Lac-Tone (a vegetable toned milk prepared from groundmit protein), using a mixed Streptococcus thermophilus and Str. lactis starter culture and various rennet or pepsin coagulants, had higher moisture and N % and lower fat % than controls made with milk. None of the Lac-Tone 'cheeses' had acceptable organoleptic properties and remained crumbly and brittle during ripening, but became palatable when processed into spreads. CDA

3 P 273
[Relationship between fatty acid contents and microflora of milk. II. Lipolytic activity of Streptococcus agalactiae.]
Bertoldini, G.; Guallini, L.; Socci, A.
Industria del Latte 4 (3) 184-88 (1968) [16 ref. It, en] [Inst. di Malattie Infettive, Profilassi e Polizia Veterinaria dell'Univ., Milan, Italy]
The lipolytic activity of 17 serological types and sub-types of Str. agalactiae against tributyrin, triolein and neutralized milk fat was studied by the method of D'Aubert & Cantoni [Boll. Ist. sieroter. milan. (1967) 46: 237]. Activity, in terms of additional ml 0.01N NaOH required to neutralize fat extracted from a microbial culture compared with the uninoculated medium, ranged from 0.3 to 6.5 for tributyrin, 0.5-5.5 for triolein and 0.0 to 2.5 for milk fat. [See Boll. Ist. sieroter. milan. (1967) 46: 548 for part I.] HBr

4 B 122
[Microbiological studies on the pasteurization of ewes' milk. V. Lactic acid flora of pasteurized milk.]
Ikonomov, L.
Veterinarnomedicinski Nauki 5 (9) 69-74 (1968) [21 ref. Bg, ru, en] [Vet. Inst. po Zarazni i Parazitni Bolesti, Sofia, Bulgaria]
17 samples of ewes' milk pasteurized for manufacture of White pickled cheese, were examined before cooling during 2 cheesemaking seasons from 4 cheese factories. 1 factory (7 samples) used (i) a drum pasteurizer operating at 68-69°C with holding time of 10-15 min. The other 3 factories used (ii) plate pasteurizers in continuous operation. Total bacterial and Streptococcus thermophilus counts in samples from (i) ranged from 70 000 to 160 000 and from 30 000 to 100 000/ml respectively; Str. lactis was never detected. In samples from (ii) the corresponding ranges were from 50 000 to 500 000 and from 20 000 to 200 000/ml; Str. lactis was detected in low numbers in 3 samples and Lactobacillus in 4 samples at ⩽10/ml. [See VetMed. Nauki Sof. (1967) 4 (3) 99-108 for part III] SKK

4 B 123
Symbiosis in yoghurt. II. Isolation and identification of a growth factor for Lactobacillus bulgaricus produced by Streptococcus thermophilus.
Veringa, H. A.; Galesloot, T. E.; Davelaar, H.
Netherlands Milk and Dairy Journal 22 (3) 114-20 (1968) [8 ref. En, nl] [Inst. for Dairy Res. (NIZO), Ede, The Netherlands]
A growth stimulating substance for L. bulgaricus produced under anaerobic conditions by Str. thermophilus has been shown to be replaceable by formic acid [See part I in FSTA (1969) 1 1D52]. A further work carried out to isolate and identify this substance, volatile fatty acids produced by Str. thermophilus were isolated and separated into 5 fractions by silica gel column chromatography. When aqueous solutions of the Na salts of these acids were neutralized to pH 6.7 with HCl and incubated with L. bulgaricus in mildly heated skim-milk, stimulating activity was shown by the formic acid fraction. CDA

4 B 163
[Study of different starters in Cheddar cheese manufacture.]
Lebedeva, K. S.; Alekseev, K. P.
Molochnaya Promyshlennost' 29 (12) 7-11 (1968) [3 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, USSR]
In manufacture of Cheddar cheese by customary procedures, 1% normal starter (mesophilic lactic streptococci) was used alone or with 0.5% thermophilic streptococcus or 0.5 or 1.0% Lactobacillus bulgaricus starter. The additions shortened cheddaring by ~30 min; 0.5% L. bulgaricus improved organoleptic properties and consistency and increased contents of amino acids and polypeptides in the ripened cheese, but 1% L. bulgaricus gave less satisfactory results. Both organisms were also grown as a mixed starter. 0.5 or 1.0% of this starter in conjunction with 1.5% normal starter gave whey acidities at the end of in-vat treatment of 19.3-20.7°T (vs. 18.3° for the normal starter alone) and shortened cheddaring by 40-50 min; organoleptic quality was unchanged with the mixed starter at 0.5%, but reduced with the starter at 1%. SKK

5 B 214
[CO_2 content of aroma bacteria in starters and cheese.]
Nielsen, E. W.
Nordisk Mejeri-Tidsskrift 34 (10) 198-204 (1968) [23 ref. Da, de, nl]
The level of CO_2 in starter cultures was found to affect the lactic acid levels as determined by alkali titration. Production of CO_2 in starters depends on the activities of aroma bacteria, especially Streptococcus cremoris and Str. diacetilactis, the former utilizing both lactose and citric acid for its production, the latter, although more actively, only the citric acid. In cheese, hole formation is affected by the aroma bacteria present and by the levels of lactose and citric acid. The rate of CO_2 formation in cheese is governed by the flora, the amount of starter added to the milk and the temp. and nutritive condition of the cheese. DJS

5 P 457
Hydrolysis of fat and protein in small cheeses made under aseptic conditions.
Reiter, B.; Sorokin, Y.; Pickering, A.; Hall, A. J.
Journal of Dairy Research 36 (1) 65-76 (1969) [30 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading, England]

Aseptically-drawn milk was made into small cheeses under aseptic conditions and the effect of bacterial and native milk enzymes on lipolysis and proteolysis in cheese was studied. Free fatty acid (FFA) content of the cheese was affected by the method of milking and by the cows' diet. For a 6-month old Cheddar cheese made with δ-gluconic acid lactone, the concn. (μmoles/5 g) of FFA higher than butyric acid was 8.9 and 2.4 when the milk was raw and heated at 63°C for 30 min respectively; when the cheese was made with Streptococcus cremoris, corresponding values were 18.6 and 5.8. Some of the cheese protein was hydrolysed by rennet to N compounds soluble in water, trichloroacetic acid or phosphotungstic acid, some of the water-soluble N apparently being used by the starter; rennet, however, did not produce any amino acids in mature cheeses. Native milk protease resisted the heat treatment used and liberated amino acids at the low pH of the cheese. The proteolytic activity of the lactic acid bacteria increased the amino acid content appreciably. MPH

5 P 473
[Studies on continuous renneting of milk. I. Influence of low temperatures during primary phase of renneting on bacteria of the genus Streptococcus.]
Dolezalek, J.; Pech, Z.
Sbornik Vysoke Skoly Chemicko-Technologicke v Praze, E-Potraviny 22: 67-82 (1968) [21 ref. Fr, cs, ru] [VSCHT, Fakulta Potrav. Technologie, Prague, Czechoslovakia]

In a continuous renneting process, 4 ml rennet and 3.22 ml 5% $CaCl_2$ solution were added to 640 ml milk and the mixture kept at 5°C for 4 h or 10°C for 2 h during the enzymatic phase, then warmed to 30°C for the coagulation phase. 1% of butter starter (Streptococcus lactis + Str. cremoris + Leuconostoc citrovorum + Leuc. dextranicum), or Str. lactis, Str. cremoris, Str. thermophilus, Str. durans or Str. faecalis was added either (i) at the start or (ii) 5 min before the end of the enzymatic phase. With method (ii) coagulation commenced earlier and a firmer clot was formed than with method (i); acidity after 24 h renneting was higher with (ii) than with (i), for all cultures except Str. cremoris which showed a slightly higher acidity with (i). Using the butter starter, acidity (°SH), acetoin (ppm) and diacetyl (ppm) production after 21 h and amino acid N content (mg/100 g) after 14 days, respectively, were: (i) 35.15, 16.03, 7.50 and 33.0; (ii) 36.6, 13.12, 13.12 and 46.05. Corresponding figures for batch method were 39.4, 6.05, 12.08 and 40.9. Continuous renneting was more satisfactory when the starter culture was added near the end instead of at the beginning of the enzymatic phase. CDA

5 P 474
[Studies on continuous renneting of milk. II. Influence of low temperatures during primary phase of renneting on Lactobacillus organisms.]
Dolezalek, J.; Pech, Z.; Mazalova, J.
Sbornik Vysoke Skoly Chemicko-Technologicke v Praze, E-Potraviny 22: 83-102 (1968) [1 ref. Fr, cs, ru] [VSCHT, Fakulta potrav. technologie, Prague, Czechoslovakia]

Cultures of Lactobacillus helveticus, L. casei, L. acidophilus or Emmental cheese starter were added to milk as in preceding abstr. and the influence of duration of enzymatic phase at 5 or 10°C on subsequent coagulation was investigated. A time of 4 h at 5°C or 2 h at 10°C was optimal for a short coagulation time and formation of a firm clot. Acidity of curd after 24 h fermentation was higher when enzymatic phase was at 5°C for 4 h than when it was at 10°C for 2 h. Addition of the starter culture ~5 min before the end of the enzymatic phase was again found the more satisfactory for continuous renneting. CDA

5 P 500
[Experiments on use of freeze-dried lactic acid bacteria in Emmental cheesemaking.] Versuche zur Anwendung von gefriergetrockneten Milchsäurebakterien in der Emmentalerkäserei.
Gehriger, G.
Schweizerische Milchzeitung 95 (16) Wiss. Beil. Nr. 120: 1013-17 (1969) [10 ref. De, fr, en] [Milchtechnisches Inst., ETH, Zürich, Switzerland]

Freeze-dried pure and mixed cultures of Lactobacillus helveticus and Streptococcus thermophilus supplied in screw top 500 ml blood transfusion bottles were re-activated by addition of boiled milk or whey at 35-40°C. Model cheesemaking laboratory expt. showed no difference in development of acidity between re-activated and corresponding untreated cultures. Tests were also carried out in 2 Emmental cheese factories in which cultures not previously used there and kept for 1 yr at 4°C after freeze-drying were compared with cultures propagated in whey in the factories. There were no noteworthy differences during manufacture and pressing of the cheeses, except that titratable acidity of whey from curd at stirring was 35°SH after incubation at 38°C for 24 h with freeze-dried cultures vs. 40°SH with factory cultures. The ripe cheeses did not differ in quality grading. SKK

6 B 260
[Preparation of starters of aroma-producing cultures.]
Chuzhova, Z. P.
Molochnaya Promyshlennost' 30 (2) 9-12 (1969) [Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, USSR]

This paper presents the results of a 3-yr study at the All-Union Milk and Cheese Industry Res. Inst. to determine the starter most suitable for commercial production of sweet-cream aromatic butter. Streptococcus diacetilactis strains 'yabl.', 60, 1268 and Zd. and Str. paracitrovorus strain $3_{4}0_{9}$ were cultured under a variety of conditions in boiled or sterilized milk and in pasteurized whey, and the 'yabl.' strain was consistently found best in combining low acid production with a high yield of aromatic substances. The following typical results were obtained when the strains listed were grown in sterile milk at 30°C for 24 h: acidity, 74°, 93°, 65°, 72° and 36°T; diacetyl, 0.470, 0.092, 0.087, 0.097 and 0.066 mg %; acetoin, 7.43, 7.47, 5.62, 7.72 and 0.78 mg %; esters, 5.28, 5.40, 6.16, 4.99 and 1.76 mg %. Strain $3_{4}0_{9}$ grew slowest in all tests. The procedure chosen and recommended for commercial use was as follows: the mother culture was prepared by inoculating 300 ml sterilized or boiled milk with 1 or 2 g respectively of dried 'yabl.' culture (the Omsk $531B_{1}$ strain of Str. diacetilactis may also be used) and incubating at 30°C for 24-36 h; 5 l. fresh whey, 12-13°T, filtered and either pasteurized at 95°C for 45 min or boiled for 10 min, and cooled to 25°C, were inoculated with 5% of the mother culture and incubated at 25°C for 16-17 h; 25 l. of pasteurized whey were inoculated with 2-5% of the 2nd culture, and incubated at 25°C for 16-17 h to give the manufacturing starter. SKK

6 P 538
[Supplementing the yoghurt flora with Lactobacillus acidophilus and Lactobacillus bifidus.] Zur Ergänzung der Joghurtflora durch Lactobacillus Acidophilus und Lactobacillus Bifidus [A review]
Mülhens, K.; Stamer, H., Sr.
Milchwissenschaft 24 (1) 25-28 (1969) [26 ref. De, en]

7 P 605
[Use of proteolytic strains of lactic streptococci in cheesemaking.]
Zalashko, M. V.; Mochalova, K. V.
Molochnaya Promyshlennost' 30 (3) 18-20 (1969) [Ru] [Otdel Mikrobiologii AN BSSR, Minsk, USSR]

220 strains of lactic streptococci (Streptococcus lactis, Str. diacetilactis, Str. paracitrovorus) were examined for proteolytic activity and divided into strong, medium and weak categories. Mixed starters prepared within each category from 2-6 strains of the named spp. were tested for persistence of proteolytic activity on subculture and for usefulness in manufacture of Dutch-type brick cheese. The findings are presented and discussed in general terms, and it is concluded that 'strong' starters maintain their activity longer and produce better cheese than 'weak' starters.

7 P 659
Milk fermenting product and method of making same.
Farr, S. M. (Dairy Technics Inc.)
United States Patent 3 420 742 (1969) [En]

A mixed bacterial culture for fermenting milk to make such products as Cottage cheese, butter, yoghurt or cultured butter, is produced by separate incubation of 2 types of bacteria and preparation of bacterial concentrates, 1 type is selected from the group Streptococcus lactis, Str. cremoris, Str. thermophilus and Lactobacillus bulgaricus, the 2nd from the group Leuconostoc citrovorun and Str. paracitrovorus; a 3rd type, Str. diacetilactis, may be incorporated. The 1st type comprises ~88% of the total bacterial count, the 2nd 8-12% and 3rd 0-4%. The mixed culture, which is stabilized by addition of glycerol, contains $\geqslant 10^{10}$ cells/ml. The culture is said to be storable in a frozen state (at -4°C) for long periods without major loss of viability. HBr

8 P 718
[Influence of freezing and freeze-drying on the survival and percentage of lactic acid fermentors in yoghurt.
Jabarit, A.
Lait 49 (483/484) 160-74 (1969) [10 ref. Fr, en] [SOCALTRA-Centre de Recherches et d'Essais, 128 boulevard Victor-Hugo, 92-Clichy, France]

Physico-chemical properties of yoghurt were not affected by freezing but changes occurred in the relative proportions of Lactobacillus bulgaricus and Streptococcus thermophilus; these varied from 51 and 49% for the 2 organisms, respectively, in fresh yoghurt to 60 and 40% in yoghurt frozen at -25°C. The total number of surviving organisms decreased gradually with decrease in freezing temp., from 10^{12}/ml in fresh yoghurt to ~10^{9}/ml in samples frozen at -35°C. Proportions of L. bulgaricus and Str. thermophilus were less affected by freeze-drying, although numbers of surviving bacteria were slightly less than in corresponding frozen samples. In the freeze-drying process, a heating temp. of 25-35°C was optimum for keeping the time of the 3rd phase of the process to a min., thereby maintaining max. viability of the yoghurt bacteria. CDA

8 P 735
Growth stimulation of Lactobacillus species by lactic streptococci.
Branen, A. L.; Keenan, T. W.
Applied Microbiology 17 (2) 280-85 (1969) [17 ref. En] [Food Sci. Inst., Purdue Univ., Lafayette, Indiana 47907, USA]

Cell extracts of Streptococcus spp. important in cheese starters stimulated growth of Lactobacillus spp. common to Cheddar cheese. 2 L. plantarum, 2 L. brevis and 1 L. casei strains were stimulated by 1 strain of Str. diacetilactis; a 2nd strain of L. casei was highly stimulated by another strain of Str. diacetilactis and a strain of Str. lactis. The stimulant could be dialysed and the dialysate was not inactivated by filter or autoclave sterilization; non-dialysed extracts were partially inactivated by autoclaving. The stimulant was active at 10°C, indicating that the stimulatory effect may influence growth of lactobacilli in Cheddar cheese during ripening. Viable Streptococcus cells did not interfere with growth of Lactobacillus spp., and it is suggested that lysis of streptococcal cells could result in release of the stimulant into the medium. CDA

8 P 757
[Effect of starter type on flavour and aroma of Gouda cheese.]
Galesloot, T. E.; Robbertsen, T.; Badings, H. T.
Officieel Orgaan van de Koninklijke Nederlandse Zuivelbond 61 (11) 245-47 (1969) [Nl, en]

Flavour and aroma were evaluated for batches of Gouda cheese made with 3 different types of starter: B (containing only Leuconostoc cremoris as aroma-forming bacteria), D (only Streptococcus diacetilactis), and BD (both types of organism). Although preference was shown for the cheeses made with BD, followed by those made with D and B in that order, it was considered that for purposes of practical cheesemaking there was little, if anything, to choose between the 3 types of starter in view of the organoleptic differences that can occur during the normal cheesemaking process. HBr

9 P 783
[Gas forming micro-organisms in raw milk containing NaCl.] Gasbildende Mikroorganismen kochsalzhaltiger Rohmilch.
Abo-Elnaga, I. G.
Milchwissenschaft 24 (1) 11-14 (1969) [9 ref. De, en] [Univ., Assiut, UAR]

After incubation at 33°C for 4-16 days, gas formation was observed in 43 of 56 raw milk samples (76%) containing 7% added NaCl. Analysis of 20 of the gas-forming samples showed absence of heterofermentative lactobacilli and coliform counts of <10/ml in all cases; yeasts were present in all 20 samples in numbers ranging from <10 to 500/ml; and total bacterial counts ranged from 0.5 to 383.0 × 10^6/ml, mainly Streptococcus faecalis and lactobacilli, with some staphylococci in 7 samples. To study the development of coliforms in raw milk containing 7% NaCl, 23 samples were stored at 33°C; only 3 showed an increase in coliform count after 2 days, but without gas formation. Numbers decreased later, more rapidly than in 5 samples stored at 7°C. Yeasts did not grow or cause gas formation in white pickled cheese when samples were incubated under anaerobic conditions at 27°C for 5 days. [See also Milchwissenschaft (1968) 23 (4) 198-200.] HBr

9 P 831
[Preparation of concentrated frozen suspensions of thermophilic lactic acid bacteria for use in cheese making.]
Valles, E.; Mocquot, G.
Lait 48 (479/480) 631-43 (1968) [10 ref. Fr, en] [Sta. Centrale de Recherches Laitieres et de Technologie des Produits Animaux, CNRZ., Jouy-Josas, France]

Lactobacillus helveticus and Streptococcus thermophilus were grown seperately at 37° in cheese whey containing (/l.) 0.5 g papain, 5 g yeast extract, 0.12 g hydrated $MnSO_4$ and either 50 g dried milk or (L. helveticus only) 40 g dried milk +15 g dried 'corn steep', at constant pH of 5.0 or 6.0 for L. helveticus and 6.5 for Str. thermophilus. After 12-16 h and 4-6 h incubation respectively, the cultures were centrifuged and resuspended in skim-milk and glycerol solution respectively, then frozen at 30°C. Frozen suspensions contained 1-4 × 10^{10} viable organisms/ml and showed no loss of activity after storage for 8 days in dry ice or 2 months at -30°C. Suspensions were used directly at the rate of 100 g L. helveticus and 10 g Str. thermophilus/l. milk for making 'Gruyere de Comté' cheeses. The estimated cost/kg of the frozen suspensions was 10.56 and 16.51 francs respectively. CDA

9 P 832
[Bitter flavour in blue cheeses.]
Salvadori, B. B.
Scienza e Tecnica Lattiero-Casearia 20 (1) 1-14 (1969) [22 ref. It, en] [Centro Sperimentale del Latte, Milan, Italy]

In studies on the causes of bitter flavour development, samples of commercial Gorgonzola cheese were diluted 1 in 10 with physiological saline, and the mixture homogenized. Homogenates were tested for milk fermenting properties, proteolytic spore-forming organisms and enterococci. Penicillins isolated from the cheeses did not cause bitter flavour development when incubated in sterile milk for 15 days at 25°C. In experimental cheeses, produced by the usual technique, using starters and Penicillium, the addition of strains of Streptococcus faecalis or Str. faecalis var. liquefaciens always led to the development of bitter flavour. IF

9 P 869
[Electrophoretic study of the caseinolytic activity of Lactobacillus jugurti.]
Annibaldi, S.
Scienza e Tecnica Lattiero-Casearia 20 (2) 103-09 (1969) [14 ref. It, en] [Istituto Sperimentale per la Zootecnia, Modena, Italy]

2 strains of L. jugurti, S27.10 and S30.11 isolated from whey starter for Grana cheese [Annali Microbiol. 17 (4/6) 201-19 (1967)], were incubated for 9 h at 45°C with skim-milk that had been pasteurized for 30 min at 63°C. The mixture was ultracentrifuged and the sediment, containing casein and bacteria, was incubated at 37°C for a further 80 days. Electrophoretic patterns are presented for the sediment after 3, 40 and 80 days incubation with each strain. It is concluded that the α-casein particularly is hydrolysed, and that the strain S30. 11 has a greater proteolytic power than S27.10. JMD

9 P 875
[Proteolytic activity of lactic acid bacteria.]
Über das Eiweissabbauvermögen von Milchsäurebakterien.
Rapp, M.
Milchwissenschaft 24 (4) 208-11 (1969) [14 ref. De, en] [Staatliche Milchwirtschaftliche Lehr- und Forschungsanstalt, Wangen im Allgau, W. Germany]

Chalk milk was inoculated with various lactic acid bacteria and the breakdown of the milk protein measured after 28 days. Streptococcus cremoris and Str. lactis showed least proteolytic activity, Lactobacillus casei somewhat higher and L. acidophilus the highest activity, followed by L. bulgaricus and L. helveticus in that order. The possible effect of proteolytic lactobacilli on cheese flavour is discussed in a short review of the literature. BR

9 P 876
[Abnormal colouration in cheese.]
Parpani, G.
Industria del Latte 4 (4) 305-08; **5** (1) 48-54 (1968/1969) [36 ref. It]

After a survey of the literature dealing with abnormal cheese colourations (reddish, red, black, grey, green, blue, white) and their possible causes, ways of preventing them are described. Since abnormal cheese colourations are most frequently caused by micro-organisms, hygienic standards of milk processing must be strictly maintained. For the washing of cheeses and workin surfaces, a 7% lactic acid solution can be used, and formaldehyde vapours should be used for fumigation. With Gorgonzola cheese, the needles should be cleaned to prevent infiltration of Brevibacterium erythrogenes causing reddish stripes. Processing rooms should be separated from ripening stores. Ripe cheeses should be quickly marketed since over-ripe products are more liable to develop abnormal colouration. Black, bluish or greenish colourations can be caused by using imperfectly tinned iron vessels. IF

9 P 881
[Annual meeting of the German Dairy Science Association in Hohenheim.] Jahresversammlung der Deutschen Gesellschaft für Milclwissenschaft in Hohenheim.
Anon.
Deutsche Molkerei-Zeitung 90 (12) 474-78; (13) 518; (14) 565-66; (15) 607-08; (16) 682 & 685; (21) 987-88; (26) 1221-23 (1969) [De]

[See preceding abstr.] Other papers presented at the meeting in Stuttgart-Hohenheim included: 'Variations in product quantities in retail packages', by H. Quest (p. 565); 'Problems of freezing cream in batch and continuous processes', by A. Rabich (p. 565); 'Modern methods of soft cheese manufacture', by L. Eisenreich (p. 565); 'Technical aspects of planning dairy plants', by G. Weber (pp. 565-66); 'Effect of environmental factors on residual N content of milk', by B. Senft (p. 566); 'Rationalization of cell counting with the Coulter counter', by E. Kleinschroth (p. 608); 'Serological detection of enterotoxins in milk and milk products', by F. Untermann (pp. 682 & 685); 'Differentiation of lactobacilli in cultured milks', by N. Weiss (p. 685); 'Possibilities and sources of error in selective counts in solid media', by G. Reuter (p. 685); 'Effect of vaccination against foot-and-mouth disease on milk properties', by -. Zaadhof (p. 987); 'Effect of mastitis frequency on milk hygiene', by -. Beck (p. 987); 'Preservation of milk samples for bacteriological, cytological and biological tests', by -. Heeschen (p. 988); and 'Dairy technology' (dealing mainly with aseptic packaging and continuous cheesemaking). FL

9 P 889
Studies on milk clotting bacterial enzymes for cheese manufacture. IV. Use of enzyme produced by Streptococcus liquefaciens-108.
Srinivasan, R. A.; Anantharamiah, S. N.; Anantakrishnan, C. P.
Indian Journal of Dairy Science 21 (3) 149-54 (1968) [11 ref. En] [Southern Regional Sta., Nat. Dairy Res. Inst., Bangalore, India]

A strain of Str. liquefaciens-108, was studied in detail for its ability to produce rennet-like enzymes for use as a rennet substitute. No enzyme was produced by the organism grown in nutrient broth, 5.0 units/ml when grown for 72 h in casein solution supplemented with 0.5% peptone, and 10 units/ml when grown for 48 h in casein-peptone solution with 0.1% lactose. Xylose also significantly induced enzyme production. When the milk proteins were partially hydrolysed by papain, up to 60 units/ml were obtained. Enzyme production was stimulated by increased oxygen tension. The enzyme showed optimum clotting at pH 5.0 and 55°C and the cheeses prepared from it were of good quality and showed no bitter tastes after 1 month. [See XV Int. Dairy Congr. (1962) B: 506 for part II.] TFF

10 P 1045
Inhibition of Staphylococcus aureus by Streptococcus diacetilactis in milk and cream filling. [Abstr. pap. read at ann. meeting Amer. Dairy Sci. Ass., June 1969]
Radich, R.; Sandine, W. E.; Elliker, P. R.
Journal of Dairy Science 52 (6) 880 (1969) [En] [Dept. of Microbiology, St. Univ., Corvallis, Orego,n USA]

Growth of Staph. aureus in sterile skim-milk was reduced by ~99% when the milk was first inoculated with 1% Str. diacetilactis, incubated for 24 h at 21°C and pasteurized. Staphylococci also grew poorly when incubated together with Str. diacetilactis for 24 h at 30°C; Staph. aureaus showed negligible growth from an initial inoculum of 10^5/ml, while Str. diacetilactis increased from 10^6 to 10^9/ml. Addition of catalase or nicotinamide did not enhance the growth of Staph. aureus, but the inhibition could be overcome by addition of 1% protein hydrolysate. Inoculation of vanilla cream filling with 10^5 Staph. aureus and 10^7 Str. diacetilactis cells/ml resulted in a decrease in staphylococci to 10^4/ml after 24 h at 25°C. CDA

10 P 996
[Use of Streptococcus bovis in starters for dairy products.]
Dilanyan, Z. Kh.; Ter-Kazar'yan, S. Sh.; Vegapetyan, K. V.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1969 (1) 95-97 (1969) [11 ref. Ru] [Erevanskii Zooveterinarnyi Inst., USSR]

The suitability of 41 strains of Str. bovis for use in starters for dairy products was examined. Mean values for characteristics studied after incubation in skim-milk at 40°C for varying times (given in parentheses where applicable) were: acidity, 94°T (24 h) and 115°T (7 days); acidity in presence of 0.5% phenol, 48°T (24 h); coagulation time, 8 h; firmness of coagulum measured by cone consistometry 0.7 g/cm^2; viscosity of coagulum 125 cP; syneresis of coagulum, 3%; 'creatin test', 32 min (24 h); and proteolysis determined by formol titration, 6 ml 0.1N alkali/100 ml (7 days). 12 of the 41 strains were selected in conjunction with 17 strains of Lactboacillus lactis for use in matsun starter. Results compared well with those for starters from natural matsun, and it is recommended that Str. bovis be used as starter for dairy products with thermophilic and mesophilic microfloras. HBr

10 P 1050
Influence of Str. thermophilus and Lb. bulgaricus culture on volatile acids content in the flavour components of yoghurt.
Turcic, M.; Rasic, J.; Canic, V.
Milchwissenschaft 24 (5) 277-81 (1969) [17 ref. En, de, fr, es] [Dept. of Chem., Univ. of Novi Sad Agric. Corp., Kikinda, Yugoslavia]

Flavour components were extracted from milk, from 12-15 h cultures of Streptococcus thermophilus and Lactobacillus bulgaricus in whole cows' milk, and from yoghurt. Volatile substances in the extracts were analysed by gas chromatography. The rations of caproic, caprylic and capric acids to butyric acid in the extract from L. bulgaricus culture were similar to the ratios in milk fat, but differed from ratios found in extracts of whole milk, Str. thermophilus culture and yoghurt. There was some degree of similarity between the ratios (particularly of caproic and caprylic acids to butyric acid) in milk fat and those in yoghurt extract. It is suggested that hydrolysis of milk fat occurs during metabolism of L. bulgaricus and that the typical flavour of yoghurt is mainly influenced by L. bulgaricus. CDA

11 P 1144
Studies on the proteolytic action of dairy lactic acid bacteria. VI. Action of intracellular protease of Streptococcus cremoris on casein.
Ohmiya, K.; Sato, Y.
Agricultural and Biological Chemistry 33 (5) 662-68 (1969) [18 ref. En] [Lab. of Food Sci. and Technology, Faculty of Agric., Univ., Nagoya, Japan]

Intracellular protease (IPLB) was extracted from cells of Str. cremoris after incubation for 48 h at 30°C. The hydrolysing action of IPLB solution (containing 1 mg N/ml) and of 1% rennet solution on α_s-, crude $\varkappa$-, β- and whole casein (0.6% solutions) was determined by measuring the amounts of tyrosine, sialic acid, nonprotein N and Ca-insensitive substance released. The relative specific turbidity (RST) and dissymmetry coeff. of the caseins, and particle wt. and UV absorption spectra of hydrolysed whole caseins were measured. Results indicate that IPLB hydrolyses α-casein more readily than the other casein fractions, and that rennet hydrolyses $\varkappa$-casein more readily; amounts of sialic acid released after 24 h hydrolysis from α_s- and crude $\varkappa$-casein being respectively: (rennet) 13 and 45%; (IPLB) 67 and 9%. Particle wt. ($\times 10^6$) of casein hydrolysed by IPLB was 1.3 vs. 0.6 for control casein, indicating a structural change probably induced by IPLB. RST measurements suggest that aggregation of the casein hydrolysates occurred and was influenced by the extent of hydrolysis. Negligible changes occurred in the dissymmetry coeff. [See Agric. biol. Chem. (1968) 32: 297 for part V.] JA

11 P 1145
Studies on the proteolytic action of dairy lactic acid bacteria. VII. Action of intracellular protease of Lactobacillus bulgaricus, Lactobacillus helveticus or Streptococcus lactis on casein.
Ohmiya, K.; Sato, Y.
Agricultural and Biological Chemistry 33 (5) 669-75 (1969) [15 ref. En]

Proteolytic actions of intracellular proteases (IPLB) extracted from cells of (i) L. bulgaricus, (ii) L. helveticus and (iii) Str. lactis were compared with those of IPLB from Str. cremoris (see preceding abstr.) Results indicate that the 3 IPLBs hydrolyse α_s-casein more readily than the other casein fractions. Amounts of sialic acid released by IPLB action after 24 h hydrolysis from α_s and crude $\varkappa$-casein were respectively: IPLB from (i), 48 and 24%; IPLB from (ii), 15 and 15%; and IPLB from (iii), 28 and 6%. Particle wt. ($\times 10^6$) of whole casein hydrolysed by IPLB from (i), (ii) and (iii) respectively, were 1.9, 1.8 and 1.5 vs. 0.6 for control casein. RST of α_s, β- and whole casein after 6 h hydrolysis had increased slightly but that of $\varkappa$-casein showed a considerable increase with all 3 IPLBs. Dissymmetry coeff. showed negligible changes after hydrolysis for 6 h. JA

12 P 1212
[Yoghurt with bifidus bacteria.] Auf neuen Wegen in der Joghurt-Forschung durch Bifidus.
Anon.
Molkereizeitung 23 (34) 1115 (1969) [De]

A feature of a new type of yoghurt introduced in W. Germany is that it is made with the addition of Lactobacillus bifidus and L. acidophilus cultures. The yoghurt is said to contain ~30 million bifidus bacteria/g. FL

12 P 1213
Cultured milk product.
Yakult Honsha KK
British Patent 1 157 135 (1969) [En]

The aqueous extract of an autolysate of fresh chlorellae or scenedesmus is mixed with sugar and milk to form a nutrient medium, which is cultivated with Lactobacillus acidophilus. IFT

12 P 1232
Extended storage of Streptococcus lactis in phosphate buffer.
Holland, M. L.; Koburger, J. A.
Journal of Dairy Science 52 (9) 1453-55 (1969) [7 ref. En] [Dept. of Plant Pathology and Bact., Univ., Morgantown, West Virginia 26506, USA]

Studies on long-term storage of Str. lactis in 0.25M phosphate buffer indicated that a culture could be kept viable and highly active for at least 48 days at 4°C. Addition of 0.5% lactose caused a rapid loss in activity during storage. Addition of casein or Jaguar gum as adjuvant had negligible effect on cultures stored at 4°C, but had a protective effect at 22°C, cultures stored at this temp. retaining some activity after 40 days; controls (without adjuvant) stored at 22°C lost all activity by the 20th day. [See also FSTA (1969) 1 2B41 & J. Dairy Sci. (1966) 49 (4) 365-69.] CDA

GENERAL

1 B 23
The enumeration of aromabacteria in BD starters.
Waes, G. .
Netherlands Milk and Dairy Journal 22 (1/2) 29-39 (1968) [6 ref. En, nl] [St. Inst. Res. Dairying, Melle, Belgium]

Various media for enumeration of leuconostocs and Str. diacetilactis in BD starters, either separately or on 1 agar plate, were evaluated. 2 media incorporating calcium lactate (modified medium of Nickels and Leesment and WACCA 0.5%) are recommended for enumeration of both types of organism on a single plate, followed by identification of colonies with zones on selective media; WACCA 1% + 0.3 IU penicillin/ml is recommended for enumeration of leuconostocs in an excess of Str. diacetilactis, which is commonly encountered in these starters. CDA

2 B 34
[On the beer-spoiling organisms of the genus Lactobacillus (Beer-Lactobacillus rods). I. Physiology, ecology and classification of the beer-spoiling lactobacilli.] Über die bierschädlichen Bakterien der Gattung Lactobacillus (Biermilchsäurestäbchen). I. Physiologie, Okologie und Artzugehörigkeit der bierschädlichen Laktobazillen. [A review]
Wackerbauer, K.
Monatsschrift für Brauerei 21 (10) 288-94 (1968) [81 ref. De, en, fr] [Versuchs- und Lehranstalt für Brauerei, Berlin, Germany]

2 B 41
Storage of lactic streptococci. II. Proteinase synthesis following storage in phosphate buffer.
Smittle, R. B.; Koburger, J. A.
Journal of Dairy Science 51 (11) 1752-55 (1968) [15 ref. En] [Dept. Plant Pathology and Bacteriology, West Virginia Univ., Morgantown, USA]

Streptococcus lactis cells were stored at 4°C in 0.05 M phosphate buffers at pH 4.5 and 8.5 as described in part I [J. Dairy Sci. (1966) **49** (4) 365-69]. Stability and synthesis of extracellular proteinase following storage was measured by incubation of the cells in steamed, reconstituted dried skim-milk after various storage times. The amount of proteinase synthesized during the 1st 3 h incubation in mils decreased with length of preceding storage at pH 8.5 and was negligible after 10 days storage; cells stored at pH 4.5 showed an increased capacity for proteinase synthesis up to the 4th day, then decreased to negligible amounts by the 10th day. No relationship was shown between acid production and proteinase activity; results showed that large amounts of extracellular proteinase are unnecessary for Str. lactis to exhibit a high level of acid production in milk. CDA

2 G 49
[The nutritional availability of tryptophan in foods.]
Pongpaew, P.; Guggenheim, K.
Nutritio et Dieta 10 (4) 297-308 (1968) [28 ref. En, de, fr] [Dept. Nutrition, Hebrew Univ.-Hadassah Med. School, Jerusalem, Israel]

The tryptophan content of various foodstuffs was measured using a rat growth assay method and microbiological tests with Streptococcus zymogenes and Lactobacillus arabinosus. The amount of tryptophan found, expressed as % of that obtained by chemical analysis, gave a measure of the availability of the amino acid. The availability to rats of tryptophan in egg-white protein, unheated dried skim-milk, processed soybean flour and sesame flour was high (87-101%), whereas that in fish meal and chick-peas was low (27-35%). Autoclaving dried skim-milk for 20 min significantly reduced the availability from 88 to 49%. Some of the results varied when the duration of the tests was increased from 2 to 3 wk. For the microbiological tests, the test materials were predigested with proteolytic enzymes. Results obtained with several enzymes are given in detail. The highest values were obtained with a mixture of pepsin, trypsin and erepsin. Comparison of these values with those from rat tests showed that Str. zymogenes tended to overestimate and L. arabinosus to underestimate the biological availability of tryptophan. The authors conclude that these microbiological tests cannot be used to predict the availability of tryptophan in vivo. MEG

2 H 155
Identification of stimulants for Lactobacillus bulgaricus in tomato juice.
Cogan, T. M.; Gilliland, S. E.; Speck, M. L.
Applied Microbiology 16 (8) 1215-19 (1968) [18 ref. En] [Dept. Food Sci., St. Univ., Raleigh, North Carolina 27607, USA]

Acid production in milk by L. bulgaricus NYL2 was stimulated by presence of 1 and 5% tomato juice serum. The stimulant was present only in the eluate from cation-exchange chromatography of the serum; active components were identified as adenosine and adenine. Stimulation increased as concn. adenosine increased at both 37° and 45°C; adenine was slightly stimulatory at 45°, but was inhibitory at 37°C at concn. ⩾12.5 μg/ml. CDA

2 H 156
Characterization of an inhibitor for Lactobacillus bulgaricus in tomato juice.
Cogan, T. M.; Gilliland, S. E.; Speck, M. L.
Applied Microbiology 16 (8) 1220-24 (1968) [15 ref. En] [Dept. Food Sci., State Univ., Raleigh, North Carolina 27607, USA]

When concn. tomato juice serum, as used in preceding abstr., was increased to 15%, inhibition of acid production in milk by L. bulgaricus was observed. Following purification by adsorption on charcoal and paper chromatography, the inhibitor was identified from UV-absorption spectra and thin-layer chromatography as a 1:1:2 or 1:1:4 adenine:phosphate:xylose nucleotide. CDA

2 J 153
Variations among homofermentative lactobacilli from cucumber brines.
Fleming, H. P.; Etchells, J. L.; Bell, T. A
Sellars, R. L.
Bacteriological Proceedings 1968: 7 (1968) [En] [North Carolina St. Univ., Raleigh, USA]

Fermentation abilities and responses under stresses of salt concn. and temp. of homofermentative lactobacilli isolated from commercial cucumber brines were studied. The ultimate objective was to acquire cultures with superior characteristics for bulk fermentation inoculation. Samples subcultured from cucumber brines into cucumber juice broth (pH 4.5, 4% NaCl, 0.025% sodium sorbate) were incubated at 18°C. When sufficient growth developed the broths were plated with a selective medium for lactobacilli (no details). Of 100 isolates obtained from different geographical locations 30 were low gas formers and produced mainly acid. Sugar utilisation and acid production varied; the amount of NaCl influenced this variation. Growth rates and cell morphology also varied. AS

3 B 76
[Beer-spoiling organisms of the genus Lactobacillus (Beer lactobacillus rods). II. Physiological investigations on lactobacilli.] Über die bierschädlichen Bakterien der Gattung Lactobacillus (Biermilchsäurestäbchen). II. Physiologische Untersuchungen an Laktobazillen.
Wackerbauer, K.; Emeis, C. C.
Monatsschrift für Brauerei 21 (11) 328-33 (1968) [37 ref. De, en, fr] [Versuchs- und Lehranstalt für Brauerei, Berlin, Germany]

An investigation of the fermentability of sugar alcohols by beer lactobacilli gave poor agreement with other authors' results to demonstrate the variability of the action. L. brevis comprised 87% of the organisms, the rest were L. plantarum. Growth limits were 5-8° to 38-40°C, the optimum being 28-32°C. Addition of hops was necessary to inhibit most lactobacilli; only the above 2 spp. being able to grow in the presence of hops. Continuously cultivated hop-sensitive lactobacilli could be slightly adapted to hops, stationary cultures could not. A literature survey of the fermentability of sugar by lactobacilli is given. PU

3 B 111
[The role of a phytocide.] Die Rolle der Phytonzide in der Haltbarmachung von Lebensmitteln.
Gal, I. E.; Vajda, Ö.
Nahrung 12 (6) 623-30 (1968) [21 ref. De, en, ru] [Städtisches Inst. für Chemie und Lebensmitteluntersuchung, Budapest, Hungary]

By means of a turbidimetric method, a crystalline phytocide (produced in Hungary from hemp residues) was tested for its effectiveness against Lactobacillus plantarum and Leuconostoc mesenteroides in tomato juice (pH 4.2) and standard broth (pH 7.2) incubated at 27 and 37°C. The phytocide was effective in tomato juice at a level 1:200 000 and in standard broth at a level of 1:100 000. These concn. caused no detectable off-flavour in tomato juice or raspberry juice. AS

3 H 229
[Alkali treatment for the microbiological assay of pantothenic acid in beer.] Alkaliaufschluss vor der mikrobiologischen Pantothensäure-Bestimmung in Bier.
Weinfurtner, F.; Eschenbecher, F.; Bauer, H.
Internationale Zeitschrift für Vitaminforschung 38 (3/4) 383-86 (1968) [15 ref. De] [Inst. für Technische Mikrobiologie und Technologie der Brauerei, Weihenstephan, W. Germany]

The effect of different extraction methods on the microbiological determination (with Lactobacillus arabinosus ATCC 8014) of pantothenic acid in beer is described. Treatments (details given) were with (1) papain and diastase, (2) papain and takadiastase, (3) Mylase P, (4) cold alkali and (5) cold alkali followed by papain and diastase. The pantothenic acid content (μg/l.) of the untreated beer (lager) was 740 and after the different treatments, (1) 990, (2) 1190, (3) 890, (4) 2260 and (5) 1960. The alkali treatment (4) gave higher values than the enzyme methods normally used to release pantothenic acid. MEG

3 H 234
[Microbial spoilage of unrefined sake. XII. Fermentation of sake yeast in mixed culture with lactobacilli.]
Momose, H.; Sotoike, R.; Koizumi, T.
Journal of the Society of Brewing, Japan 63 (8) 871-73 (1968) [5 ref. Ja] [Res. Inst. of Brewing, Takinogawa, Kita-ku, Tokyo, Japan]

Fermentation ability of the yeast per dry cell wt. in mixed culture decreased in parallel with the cultivation time. Reasons for the stagnancy of the alcohol fermentation of spoiled moromi (unrefined sake) are discussed. [See J. Soc. Brew. Japan (1961) **56:** 68; (1963) **58:** 647; Report Res. Inst. Brewing, Tokyo (1966) **138:** 12.] HK

4 A 101
[Results of a comparative analysis of thiamine in the countries of the Council for Mutual Economic Aid.] Ergebnisse einer Thiaminvergleichsanalyse innerhalb der RGW-Länder.
Cerna, J.; Pickova, J.; Fronek, P.
Nahrung 12 (7) 739-43 (1968) [2 ref. De, ru, en] [Zentralforschungsinst. für die Lebensmittelind., Prague, Czechoslovakia]

11 lab. carried out comparative determinations of thiamine in egg powder, milk powder and freeze-dried pork by the thiochrome method and a microbiological method using Lactobacillus viridescens. The coeff. of variability was calculated for the thiochrome method, which was preferred and recommended to be the standard method. IN

4 B 121
Type strains of Lactobacillus species. A report by the Taxonomic Subcommittee on Lactobacilli and Closely Related Organisms. A subcommittee of the International Committee on Nomenclature of Bacteria of the International Association of Microbiological Societies. [A book]
Hansen, P. A. (Secretary)
89pp. (1968) [60 ref. En] Rockville, Maryland, USA: American Type Culture Collection.

In this taxonomic study, 15 methods used for identification of Lactobacillus spp. by some or all of the 9 participating laboratories are described (pp. 7-21). Data collected on 20 ATCC and 2 NCDO strains are given on pp. 21-52 and descriptions of the strains are summarized on pp. 53-75. As a result of this study, the Subcommittee recommend that the genus Lactobacillus should include 9 type, 3 neotype and 2 reference strains; 3 further strains are still under study as possible neotypes. CDA

4 B 145
[Microbiology of wine.] [Conference proceedings]
Anon.
Bulletin de l'Office International du Vin 41 (450/451) 979-98 (1968) [Fr]

The 5th meeting of the working group on "Microbiology of Wines" was held in Paris in May 1968. The agenda included: (i) 'microbiological methods for measuring antiseptics in wine'; and (ii) 'lactic acid bacteria in wine'. This report gives full details of the discussions on the collaborative trials held during 1968 to study (i), but no details of the methods used or the results are given. It also reports the discussions under ite m(ii) on the taxonomy of the lactic acid bacteria of wine and on the problems of cataloguing and determining these bacteria. MEG

4 B 162
Animal feed supplement.
Wenner-Gren Medical Laboratory Aktiebolag
British Patent 1 134 206 (1968) [En]

A feed supplement claimed to contain viable lactic acid bacteria is covered. Its preparation, as given in 1 example, consists of cultivating Lactobacillus bulgaricus + Streptococcus thermophilus in skim-milk at 42°C for 2-5 h, cooling the product to 15°C and spray-drying it at 60-65°C. Results of tests with the feeding of the supplement to chickens and pigs are given. FL

5 B 184
[The recognition of beer-spoilage lactobacilli.]
Zur Kenntnis der biersäuernden Laktobazillen.
Eschenbecher, F.
Brauwissenschaft 21 (11) 424-37; (12) 464-71; **22** (1) 14-28 (1968/1969) [161 ref. De, en, fr] [Inst. für Technische Mikrobiologie und Technologie der Brauerei II, Weihenstephan, W. Germany]

Of 660 strains of beer-spoilage lactobacilli isolated from 128 different samples, 348 were Streptobacteria (i) and 312 Betabacteria (ii). Of (i) 282 were L. casei but of these, 18 were atypical, being unable to produce acid from lactose. The remainder were assigned to a new sub-sp. Fusiformis as they produced acid from inulin and frequently had spindle, filament or club-shaped cells. 60 strains belonged to L. corynitormis and only 6 were L. plantarum var. arabinosus. Of (ii) L. brevis predominated with 264 strains, of which 14 produced acid from glucose and maltose but not from pentoses or other carbohydrates tested and were therefore classified as L. brevis var. lindneri. 48 cultures were of L. buchneri. (i) appeared more frequently than (ii) in heavily hopped beers and are more likely to grow in trade beers. All strains grew at 15°C but not at 45°C. All (i), excluding 4 cultures of L. coryniformis, produce acetoin and diacetyl but (ii) reduced both ketones irreversibly to butane-2,3-diol. A summary of the characteristics employed in identifying the isolated beer-spoilage lactobacilli is given. The bacteriostatic action of hop bitter substances, the low fermentation and lagering temp. and the changing pattern of carbohydrate composition from wort to final beer, promote growth of individual sp. of lactobacilli to different extents. On the basis of the specific fermentative properties of L. casei it is assumed that beer-spoilage lactobacilli originate mainly from the flora of the barley and pass thence to the malt and into the brewery. SW

5 B 185
[Isolation of heat resistant Streptococcus sp. and examination of its heat resistance.]
Incze, K.
Orszagos Husipari Kutatointezet Evkönyve 1967: 101-04 (1967) [3 ref. Hu, en, ru, de]

A Streptococcus sp. isolated from dry sausage inoculated into bouillon 24 h before the heat-treatment, was subjected to heat-treatment at 60°C for 1-8 h and at 70-75°C for 7-63 min. Thermal inactivation proved to be semi-logarithmically non-linear, the initial part of the curve showed a slope more inclined than the consecutive section. Thus, the D values could not be calculated. The expt. results indicate that certain Stretpococcus spp. survive even the most severe heat-treatments of tinned meat products (ham etc.) or prolonged cooking. IF

5 B 210
[Microflora of "Isterband", a Swedish fermented sausage.]
Östlund, K.; Regner, B.
Nordisk Veterinaermedicin 20 (10) 527-42 (1968) [19 ref. Sv] [Inst. för Livsmedelshygien, Kunglig Veterinärhögskolan, Stockholm, Sweden]

Isterbrand, a non-heat treated, fermented, smoked sausage product was shown to develop a Lactobacillus-Leuconostoc flora during manufacture, resulting in the low final pH of the product. Neither slight variations in the raw materials nor the use of Lactobacillus-Leuconostoc starters affected the pattern of flora development. Inocula of Staphylococcus aureus grew and survived well in Isterbrand; Salmonella typhimurium and Bacillus cereus did not survive so well. DJS

5 C 205
Ecosystems of food-contact surfaces.
Chaturvedi, S. K.; Maxcy, R. B.
Food Technology (Champaign) 23 (1) 67-70 (1969) [27 ref. En] [Dept. of Food Sci. and Technology, Univ., Lincoln, Nebraska 68503, USA]

Interactions between micro-organisms, milk films, milk solids in suspension, disinfectant residues in presence of milk soil, and soil residues on washed surfaces were studied using glass and stainless steel slides. Bacteria in fresh raw milk (~200 × 10^3 organisms/ml) inoculated onto prepared milk films, showed low capacity for survival, whereas numbers of bacteria surviving drying in soil were related to available nutrients in the soil. When surfaces were soiled with milk, washed to produce visible cleanliness, then inoculated with suspensions of Pseudomonas fluorescens, Escherichia coli, Microbacterium lacticum and Streptococcus lactis in distilled water, growth of the organisms was possible, particularly on the stainless steel surface. Quaternary ammonium compounds showed greater antibacterial potential than hypochlorite solutions in presence of milk soil; antibacterial activity diminished with increasing soil level, particularly on the stainless steel surface. The importance of the nature of the surface in bactericidal evaluation of disinfectants is stressed. CDA

6 B 237
[Experience with bacterial cultures in the manufacture of smoked meat products.]
Kargal'tsev, I. I.; Timina, G. V.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1968 (6) 67-68 (1968) [5 ref. Ru] [Moskovskii Tekhnologicheskii Inst. Myasnoi i Molochnoi Promyshlennosti, USSR]

Inoculation of chopped meat for soft sausages with Streptococcus diacetilactis increases the production of lactic acid, diacetyl, acetoin, and other taste and aroma producing volatile C acids. A procedure was established for adding glucose as a culture substrate and for stimulating formation of aromatic substances by citrates. The use of Str. diacetilactis is claimed to permit a simplified technology which eliminates the traditional salting or smoking of meat. Streptococci were found in the products but no Proteus spp. or intestinal bacteria. STI

6 B 253
Pre-fermentation inoculations with Leuconostoc mesenteroides and Lactobacillus plantarum on physico-chemical properties of fresh and dehydrated sauerkraut.
Nabors, W. T.; Salunkhe, D. K.
Food Technology (Champaign) 23 (3) 341-45 (1969) [11 ref. En] [St. Univ., Logan, Utah 84321, USA]

Sauerkraut inoculated with L. plantarum fermented slower and was significantly lower in acidity and higher in pH than cabbage inoculated with L. mesenteroides or naturally fermented. Sauerkraut processed by freeze-, conventional hot-air-, and microwave dehydration showed significant losses in volatile components, ascorbic acid, lactic acid, and increased pH. These changes were least obvious following freeze-drying. Sensory evaluation scores of freeze-dried and conventional hot-air dehydrated sauerkraut compared favourably with that of a canned commercial product. IFT

6 M 378
[Dough leaven for bread.]
Kopman, A. V.
USSR Patent 229 367 (1968) [Ru]

The leaven comprises flour, water and yeasts, and incorporates a mixture of lactic streptococci (Streptococcus lactis, Str. diacetilactis, Str. cremoris, Str. citrovorus, Str. paracitrovorus, and Str. aectoinicus). W&Co

7 B 291
[Occurrence of short-rod bacilli in brewing.] Zum Befund "Kurzstäbchen". [A lecture]
Leipner, W.
Brauwelt 109 (28/29) 517-24 (1969) [20 ref. De, en, fr] [Wissenschaftliche Sta. für Brauerei, Munich, W. Germany]

Lactobacilli, Acetobacter spp. and flavobacteria cause spoilage in the finished wort and beer but pediococci affect the finished beer only. The proteolytic coliforms produce off-flavours and reduce growth factors and vitamins required for yeast growth. Autolysis products from yeast provide the nutrient requirements of the contaminants, particularly in the lagering tank. In general, filtration removes them but the products of metabolism remain in the beer and cause flavour deterioration. Wort production in enclosed vessels, contaminant-free yeast cultures and hygienic filling are required. BR

7 B 293
The influence of long-term freezing and pickling of meat upon enterococci and coliforms.
Minks, J.
Acta Universitatis Agriculturae Facultas Veterinaria, Brno 37 (3) 425-31 (1968) [10 ref. En, cs, ru] [Dept. of Public and Tropical Vet. Med., Vet. Faculty, Univ. of Agric., Brno, Czechoslovakia]

15 mm cubes of lean pork were inoculated with a suspension of either Streptococcus faecalis or Eschericha coli. ½ the contaminated meat cubes were frozen and stored at -18°C. The other ½ were dry salted at 2°C for 24 h followed by the addition of brine and storage at 2-5°C. The frozen or pickled meats and the brine were sampled every 4 wk to determine the number of surviving orginisms. In frozen meat 90% of the Str. faecalis organisms survived during the 26 wk at -18°C, whereas the E. coli count decreased to 1% of the initial value. In the pickled meat the E. coli count decreased similarly to 2% in 22 wk. The Str. faecalis count decreased during the 1st 2 wk, increased to 150% at 10 wk and then decreased slowly to 59% at the end of 22 wk. The enterococci are better indicators of the initial microbiological quality of frozen or pickled meats than coliforms. MEG

7 G 282
Lactic acid bacterial fermentation of burong dalag.
Orillo, C. A.; Pederson, C. S.
Applied Microbiology 16 (11) 1669-71 (1968) [3 ref. En] [Coll. of Agric., Univ., Laguna, Philippines]

Two preparations of burong dalag, a fermented fish and rice food of the Filipinos, were examined microbiologically and chemically. The lactic acid fermentation was accomplished by Leuconostoc mesenteroides, Pediococcus cerevisiae, and Lactobacillus plantarum, although strains of Streptococcus faecalis and micrococci were also present in the first few days. The pH was lowered to <4.0, and ~0-9% lactic acid was attained in 1 wk. Careful sealing of the surface of the fermentation mixture (79.5% moisture), was necessary to prevent growth of moulds and yeasts. TFF

7 P 594
[Composition for the preparation of yoghurt.]
Simon, P.; Devallerie, R. J. L.
French Patent 1 529 590 (1968) [Fr]

A mixed culture of Lactobacillus bulgaricus and Streptococcus thermophilus is inoculated into tubes containing sterile milk. After incubation at 37°C for 6 h, these cultures are used to inoculate 6 sterile 1-litre Erlenmeyer flasks containing 200 ml of a nutritive medium. After 15 h of aerated and shake culture, while the pH is maintained at 5 with sodium acetate, the medium is halved and each portion centrifuged aseptically. One portion is freeze-dried after washing in physiological saline. The other portion is washed in sterile distilled water, suspended in distilled water and incubated for 5-6 days at 37°C. Autolysis of the bacteria results in liberation of enzymes. A sterile solution of these enzymes, obtained by filtration, is vacuum dried at < 40°C and pulverized. The 2 dried products are mixed with 10 kg dried skim-milk and the final productis packaged. Yoghurt is obtained by mixture with water. W&Co

7 T 210
[Sausage additive.]
Neraal, L. F.
Norwegian Patent 115 511 (1968) [No]

An additive for controlling the pH changes in sausages consists of a combination of gluconic acid δ-lactone, non-pathogenic, nitrate-reducing, lactic acid-producing micrococci, and, optionally ⩾ 1 mesophilic lactobacilli, e.g. L. plantarum or L. casei, together with substances such as polyphosphates, ascorbic acid and dextrose. The additive enables sausage products of improved quality to be obtained by controlling changes in colour, ripening, flavour and consistency. W&Co

8 B 324
Inhibition of food spoilage Pseudomonas by Lactobacillus species.
Lee, J. S.; Price, R. J.
Bacteriological Proceedings 1969: 13 (1969) [En] [St. Univ., Corvallis, Oregon, USA]

Heavy growth of Lactobacillus in oysters has been observed despite the high initial number of Pseudomonas present. Since the flora change took place under conditions that favoured the growth of Pseudomonas, an interaction between the 2 genera was suspected. 2 test cultures were grown in a common medium in a Bellco spinner flask, which separated the cells by a semipermeable membrane. The growths of 2 cultures at 7°, 15° and 30°C were determined by optical density and by viable count. 3 Lactobacillus spp. isolated from oysters all inhibited the growth of 6 Pseudomonas spp. isolated from various seafoods. The inhibition was most marked against Type III Pseudomonas spp., which has been classified as the 'spoiler'. Lactobacillus, however, did not inhibit the growth of Salmonella typhimurium or Escherichia coli. The anti-Pseudomonas substance accumulated in Lactobacillus growth medium and could be concentrated by freeze-drying. The max. effectiveness was observed at pH 6.7. Autoclaving and 0.5N perchloric acid treatment destroyed the activity. AS

8 G 327
Lactobacillus acidophilus or Lactobacillus casei.
Fowler, G. G.
Milchwissenschaft 24 (4) 211-13 (1969) [13 ref. En, de] [Aplin & Barrett Ltd., Yeovil, Somerset, England]

In a survey of commercial preparations used for treatment of intestinal disorders, and claimed to contain only viable L. acidophilus cells, the following organisms were repeatedly found: L. acidophilus (2 preparations), L. casei (1), L. casei var. rhamnosus (12), L. fermenti (2), L. plantarum (1) and no viable lactobacilli (5). Of 19 published reports where named preparations have been successfully used, 9 could be attributed to L. acidophilus and the rest to L. casei var. rhamnosus. The designation of a strain of L. acidophilus as oral or intestinal (Reuter, Zentbl. Bakt. Parasitkde, I Orig. (1964) **193** (4) 454-66) was shown to be affected by induced resistance to various antibiotics. CDA

10 H 1034
[Conditions for growth of Pediococcus cerevisiae (beer sarcina) in beer with particular reference to its utilization of nitrogenous substances.] Ernährungsbedingungen für Pediococcus cerevisiae (Biersarcina) in Bier unter besonderer Berücksichtigung der Stickstoffernährung.
Uhl, A.; Kühbeck, G.
Brauwissenschaft 22 (4) 121-29, (5) 195-207, (6) 248-54 (1969) [58 ref. De, en, fr] [Inst für Technische Mikrobiologie und Technologie der Brauerei II, Weihenstephan, W. Germany]

Fractionation of nitrogenous components of beer, combined with growth tests on basal medium + pool amino acids showed that a neutral ethanol-soluble fraction of beer contained the compounds required by P. cerevisiae. They were shown to consist of a peptide fraction and a ninhydrin negative fraction, 3f. UV examination of 3f showed 10 fluorescent fractions, but it could not be replaced by the leuco-anthocyanins, flavonols and cinnamic acid derivatives present in hops and malt. For optimal growth, only the ethanol-soluble peptide fractions 3a, 3b and 3c, fraction 3f, the mineral salts KH_2PO_4, $MgSO_4$, $CaCl_2$ and $MnSO_4$, aspartic acid, histidine and glutamic acid are required. It was concluded that P. cerevisiae is unable to synthesise certain amino acid sequences and requires preformed short chain peptides which could be obtained by extracellular hydrolysis of medium- or long-chain peptides supplied in the medium. The selection of barley for brewing and its subsequent processing in the light of the peptide requirement of P. cerevisiae is discussed. The growth-stimulating effect of Mn in concn. of 2.5-25 mg/l. and its importance in brewing technology is reviewed. RM

10 S 708
[Experiments in improving the quality of Turkish dry sausage by adding strains of Micrococcus and Pediococcus.] Versuche zur Qualitätsverbesserung der türkischen Rohwurst durch Zusatz von Mikrokokken und Pediokokkenstämmen.
Inal, T.
Fleischwirtschaft 49 (4) 487-93 (1969) [21 ref. De, en, fr, it, es] [Bundesanstalt für Fleischforschung, 8650 Kulmbach, Blaich 4, W. Germany]

A series of Turkish dry sausages were incubated during manufacture with cultures of Micrococcus aurentius and Pediococcus cerevisiae strains, and with a mixture of both. The sausages were examined at regular intervals during manufacture, their pH was measured, bacterial association was established and they were tested organoleptically. The mean pH of the inoculated sausages was lower than that of the non-inoculated sausages. It was found, in general, that inoculation speeded up the maturing process. The composition and method of preparation of Turkish sausages are described. FJW

10 S 714
The antagonism of enterococci on other bacteria in canned hams.
Kafel, S.; Ayres, J. C.
Journal of Applied Bacteriology 32 (2) 217-32 (1969) [55 ref. En] [Vet. Inst., Pulawy, Poland]

The competitive growth of enterococci (50 strains of Streptococcus faecium and 10 strains each of Strep. durans and Strep. faecalis isolated from canned hams from 5 meat processing plants) against that of 10 strains each of Clostridium perfringens, Cl. bifermentans, Cl. sporogenes, Lactobacillus viridescens, a Leuconostoc sp., Bacillus cereus and B. licheniformis (all recovered from canned hams) and 3 stock culture strains each of Cl. botulinum types A and E, was investigated. All enterococci showed antagonistic action against other organisms, but that of Strep. faecalis was most intense. They lowered the pH of APT (All Purpose Medium with Tween 80) agar medium, so that the bacteria failed to proliferate and spore germination was often inhibited. Of 4241 cans examined, 45.6% contained enterococci; spoilage rate of these cans was 1.9%, but of cans, not contaminated with enterococci, the rate was 3.7%. Investigation of canned hams, contaminated with enterococci, showed clostridia present in 2.0% and bacilli in 12.9%, but in uncontaminated tins figures were 6.0% and 29.1% respectively. AL

DAIRY PRODUCTS

12 B 342
[Comparative studies of products of proteolysis by different types of lactic streptococci.]
Klimovskii, I. I.; Zvyagintsev, V. I.; Gudkov, A. V.
Molochnaya Promyshlennost' 30 (5) 26-32 (1969) [12 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodelnoi i Syrodel'noi Promyshlennnosti Moscow, USSR]

In a comparative study on the proteolytic activity of different strains of Streptococcus, Str. lactis 7c, Str. diacetilactis 23g and Str. diacetilactis var. acetoinicus 605_8 were grown on sterile milk medium for 7 days at 26°C. The casein was precipitated out with acetate at pH 4.6, the whey filtered by gel column, and the N and P contents of the resultant 20 fractions determined by the Nessler and IDF techniques, respectively. Strain 23g had the greatest activity, with accumulation of soluble proteins and high-molecular wt. (>4000) peptides; strains 7c and 605_8 (which had the lowest activity) produced more low-molecular wt. peptides. The expt. were repeated, but with addition of 5 g sterile rennet enzyme/100 l, milk. This addition increased the proteolytic activity of the streptococci, particularly of strain 7c; strains 7c and 605_8 both produced phosphopeptides with high P contents. The authors contend that differences in N equal UV-light absorption and N:P ratios do not permit classification of Str. lactis and Str. diacetilactis as single species (cf. Bergey's Manual of Determinative Bacteriology). [See also Moloch. Prom. (1969) 30 (6) 10-14.] HBr

12 S 818
Fermented meat product.
Dairy Technics Inc.
British Patent 1 157 423 (1969) [En]

Comminuted meat is fermented with a conc. thawed bacterial culture of Pediococcus cerevisiae at 110-125°F to bring about rapid action with a min. growth of undesirable bacteria. IFT

01 P 77
[Method of the manufacture of a protein milk product.]
Bryzgin, M. I.; Shalygina, A. M.; Popova, T. V.; Vasil'ev, P. V. (Ukrainskii Nauchno-issledovatel'skii Institut Myasnoi i Molochnoi)
USSR Patent 235 538 (1969) [En]

To improve the utilization of milk constituents, pasteurized milk is concentrated (e.g. to 36-38% TS), cooled and filled into moulds in which it is coagulated, using a starter consisting of Streptococcus lactis, Str. thermophilus and Lactobacillus casei, and pressed with only a negligible whey drainage (5-10%). The salting is carried out by adding salt to the concentrated milk at the same time as the starter is incorporated. The process may be used for instance for Bryndza manufacture. FL

01 P 83
[A method for producing a cultured-milk product of the cultured-cream type.]
Bryzgin, M. I.; Protsenko, A. L.; Mastakov, N. N.; Yaremenko, N. F. (Ukrainskii Nauchno-issledovatel'skii Institut Myasnoi i Molochnoi Promyshlennosti)
USSR Patent 242 658 (1969) [Ru]

A feature is that cream in the manufacture of a cultured-cream type product is fat-standardized by adding to it concentrated milk with 38-42% TS. A mixture (1:1) of Streptococcus thermophilus and Lactobacillus jogurti is used as the culture and the product is incubated to an acidity of 130-140°T. The finished product contains ~25% butterfat, and because of the addition of concentrated milk, has increased contents of milk protein, lactose and minerals and is claimed to have an improved consistency and keeping quality. FL

01 P 86
[Method of producing a lactic drink from buttermilk.]
Sukhotskene, I. I.; Bernotene, O. P. (Litovskii Filial Vsesoyuznogo Nauchno-issledovatil'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 234 140 (1968) [Ru]

Buttermilk from sweet-cream butter manufacture is pasteurized and inoculated with a culture consisting, in addition to acidophilus bacteria, also of lactic streptococci (including aroma-producing spp., e.g. Str. diacetilactis), the ratio of the streptococcal to acidphilus culture being 7:3. The aim is to improve the aroma and flavour of the beverage. FL

01 P 119
Influence of mastitis on properties on milk. II. Acid production and curd firmness.
Hampton, O.; Randolph, H. E.
Journal of Dairy Science 52 (10) 1562-65 (1969) [10 ref. En] [Dept. of Animal Sci., A & M Univ., College Sta., Texas 77843, USA]

The influence of mastitis on acid production and curd firmness was investigated using samples of Wisconsin Mastitis Test (WMT)-positive (>25 mm) and -negative (>10 mm) milk from 9 individual cows and from 3 groups of 5 cows. In skim-milk from WMT-positive and -negative samples respectively, average time taken to reduce pH to 4.8 was as follows: with Streptococcus lactis C_2 (a strain resistant to natural agglutinins of skim-milk), 263 and 251 min; with Str. cremoris R1 (susceptible to skim-milk agglutinins), 288 and 248 min. Firmness of coagula produced by these cultures in skim-milk were >70% lower in WMT-positive than in corresponding WMT-negative samples at pH 5.0 and 4.8. [See FSTA (1969) 1 10P898 for part I.] CDA

01 P 120
Influence of mastitis on properties of milk. III. Lactic culture inhibitory activity and inhibition titres.
Randolph, H. E.
Journal of Dairy Science 52 (10) 1566-68 (1969) [12 ref. En]

Acid production by Streptococcus cremoris strains R1 and HP (susceptible to milk agglutinins) and Str. lactis C2 (resistant) was similar in WMT-positive and -negative whole milk. Acid production by R1 and HP was lower in whole milk than in corresponding skim-milk, but increased in heat treated (90°C for 20 min) milk to a similar level in both types of milk; acid production by C2 was not affected by heat treatment or skimming. WMT-positive skim-milk inhibited strains R1 and HP by 39.8 and 35.0% respectively vs. 30 and 37% with WMT-negative skim-milk; corresponding inhibition titres (highest dilution of raw skim-milk in a heated sample of the same milk, showing >1/10 pH unit less acid than control) were 1:16 and 1:8.8 in WMT-positive vs. 1:8.2 and 1:5.7 in WMT-negative skim-milk. C2 was not inhibited and did not show an inhibition titre with any of the samples. [See preceding abstr. & J. Dairy Sci. (1968) **51** (1) 8-15.] CDA

)1 P 137
Preparation of concentrated lactic streptococcus starters.
Peebles, M. M.; Gilliland, S. E.; Speck, M. L.
Applied Microbiology 17 (6) 805-10 (1969) [13 ref. En] [Dept. of Food Sci., St. Univ., Raleigh, North Carolina 27607, USA]

3 single-strain cultures of Str. cremoris were grown at 25°C at controlled pH in tryptone-yeast extract-glucose-lactose broth, then centrifuged, resuspended in 10% reconstituted dried skim-milk at 2% of the original vol. and stored in vials in liquid N. Control of pH of the broth at 5.5, 6.0 and 6.5 with NaOH resulted in max. populations of 5.5-7.9 × 10^9/ml vs. 5.4 × 10^8/ml when grown without pH control. When pH was controlled with NH_4OH, max. populations obtained were ~1.5-2 × greater than when NaOH was used. Numbers consistently levelled off at about the same max. population, apparently due to inhibitory properties of the spent broth, whereas acid production continued. Cultures grown at pH 6 could be harvested as late as 6 h after reaching max. populations without any loss in activity, and concentrated suspensions could be stored for 231 days in liquid N without significant loss of viability or activity [See also J. Dairy Sci (1968) **51** (10) 1573-78.] CDA

P 138
icroflora of whey starter of Parmigiano-Reggiano eese. III. Nutritional requirements of ctobacillus jugurti.]
itteuzzi, D.
nali di Microbiologia ed Enzimologia 18 (5/6) 7-14 (1968) [22 ref. It, en] [Istituto di crobiologia Agraria e Tecnica, Univ., Bologna, ly]

All 19 strains of L. jugurti isolated from rmigiano-Reggiano cheese starters required ginine, phenylalanine, glutamic acid, leucine, lysine, proline, threonine and valine growth; leucine and tyrosine had a stimulating ect on some strains and were essential to the iers. Pantothenic acid, nicotinic acid and oflavin were also essential to all strains; ridoxine or pyridoxal was essential to some ains, but not to others. [See Annali Microbiol. 67) 17 (4/6) 201 and 211 for parts I and II.]
Br

01 P 139
Biological response of lactic streptococci and lactobacilli to catalase.
Gilliland, S. E.; Speck, M. L.
Applied Microbiology 17 (6) 797-800 (1969) [17 ref. En] [Dept. of Food Sci., St. Univ., Raleigh, North Carolina 27607, USA]

Cultures of streptococci and lactobacilli were incubated in 11% reconstituted dried skim-milk with and without 0.01 mg (30 U) catalase/ml, and samples were removed at intervals and analysed for H_2O_2 by the method described in FSTA (1969) 1 6P508. Time taken to reach pH 5 (285-483 min) decreased by the following amounts (min) in the presence of catalase: Streptococcus lactis, 51-54; Str. cremoris, 21-24; 3 commercial Cheddar cheese starters, 33, 45 and 126; Lactobacillus acidophilus and L. bulgaricus, no decrease. H_2O_2 was produced in the first 120-180 min of incubation by both streptococci and lactobacilli; levels produced by streptococci were autoinhibitory and the apparent stimulation by exogenous catalase was due to the destruction of this H_2O_2. Pyruvate and reduced glutathione decreased H_2O_2 production but had little effect on acid production by streptococci, while $FeSO_4$ prevented accumulation of H_2O_2 and stimulated rate of acid production to a greater extent than did catalase. CDA

01 P 140
A new microbial rennet.
Feldman, L. I.; Schleich, H.
Abstracts of Papers. American Chemical Society 158: MICR 12 (1969) [En] [Wallerstein Co., Division of Baxter Lab., Inc., Mariners Harbor, Staten Island, New York 10303, USA]

A new microbial rennet has been isolated from a species of Mucor. This enzyme has properties eminently suited for cheese-making. Relative to veal rennet, the Mucor enzyme exhibits increasing activity with increasing temp. or increasing Ca^{++} concn. The microbial enzyme and veal rennet are identical with respect to the low level of proteolytic activity. The temp. and pH requirements of the Mucor rennet coincide with these characteristics as employed in the manufacture of cheese. Practical cheese-making trials have been conducted. The properties of the resulting cheeses have been examined and compared with those produced with rennets from other sources. AS

2 P 161
[Studies on the proteolytic action of dairy lactic acid bacteria. VIII. Bactericidal actions of sterilants and the growth of lactic acid bacteria in milk.]
Ohmiya, K.; Sato, Y.
Journal of the Agricultural Chemical Society of Japan 43 (9) 648-53 (1969) [17 ref. Ja, en] [Faculty of Agric., Nagoya Univ., Nagoya, Japan]

Fresh raw milk was heated at 63°C for 30 min, 100°C for 30 min, or 120°C for 15 min, or treated with 0.25% β-propiolactone (BPL) at 35°C for 3 h or with 0.75% H_2O_2 at 50°C for 30 min). No viable cells were found in the milk after heating at 120°C for 15 min, or treating with BPL or H_2O_2. Heating at 120°C for 15 min or BPL treatment prolonged the milk coagulation time by rennet, but H_2O_2 treatment did so only slightly. Lactic acid bacteria (Str. cremoris) grew well in the heated or H_2O_2-treated milk, but did not grow in BPL-treated milk. H_2O_2 treatment was the most suitable method for 'sterilization' of milk to be used for the cultivation of dairy lactic acid bacteria or for experimental aseptic manufacture of cheeses. [See FSTA (1969) 1 (1969) 11P1145.] MY

2 P 178
Effect of lactic starter culture on pink discolouration and oxidation-reduction potential in Italian cheese.
Shannon, E. L.; Olson, N. F.; Elbe, J. H. von.
Journal of Dairy Science 52 (10) 1557-61 (1969) [14 ref. En] [Dept. of Food Sci., Univ. Madison, Wisconsin 53706, USA]

15 cultures of high-temp. streptococci and lactobacilli were evaluated for their effects on development of pink discolouration in Romano cheeses. Certain strains of lactobacilli used as starter cultures were found to be consistently associated with appearance of the discolouration, whereas other strains and strains of Streptococcus thermophilus, never caused the defect. Using a combination of Str. thermophilus together with defect-producing Lactobacillus strains resulted in a delayed appearance of discolouration. Cheeses made with cultures associated with the discolouration always had a higher oxidation-reduction potential, as indicated by neutral red indicator 48 h after manufacture, than cheeses made with cultures not associated with the defect at the same stage of ripening. Development of pink discolouration was accelerated by higher ripening temp. and appeared to be enhanced by penetration of O_2 into the cheese but not by absoption of NaCl by the cheese. AS

2 P201
Degradation of DDT and DDE by cheese micro-organisms.
Ledford, R. A.; Chen, J. H.
Journal of Food Science 34 (4) 386-88 (1969) [10 ref. En] [Dept. of Food Sci., Cornell Univ., Ithaca, New York 14850, USA]

Spp. of micrococci, streptococci, yeasts and Gram-positive rods were isolated from Roquefort, Blue, Limburger, Liederkranz and Brick cheeses. Representative isolates were incubated at 30°C for 10 days in media containing 0.5 ppm lindane, DDE and DDT. Residual pesticides were determined by gas chromatography. The 3 pesticides were unchanged by the micrococci and streptococci. A Gram-positive rod, similar to Brevibacterium linens, dechlorinated DDT to form DDD, while a Geotrichum spp. degraded both DDT and DDE to unknown compounds. Geotrichum candidum ATCC 12784 behaved similarly. The possibility that residues of DDT and DDE might be degraded in certain types of surface-ripened cheese is discussed. MEG

2 P 227
Flavour in fermented dairy products.
Sandine, W. E.; Elliker, P. R.
Abstracts of Papers. American Chemical Society 158: MICR 29 (1969) [En] [Dept. of Microbiology, St. Univ., Corvallis, Oregon 97331, USA]

Compounds believed involved in flavour and aroma of non-ripened fermented dairy products include lactic and acetic acids, acetaldehyde, formic acid, ethanol, carbon dioxide, diacetyl, dimethyl sulphide and other sulphur compounds, methyl ketones, primary and secondary alcohols, methyl and ethyl esters of aliphatic acids and lactones. Homofermentative lactic streptococci (Streptococcus lactis and Str. cremoris) ferment milk lactose by the hexose diphosphate pathway to produce lactic acid with small amounts of the other products. Heterofermentative streptococci (Str. diacetilactis) and Leuconostoc (Leuconostoc citrovorum) use the hexose monophosphate pathway producing less acid and more of the other end products, depending on aeration; they also ferment citric acid, producing diacetyl via both α-acetolactate and acetyl CoA. Over 100 compounds have been identified in the volatile fraction of Cheddar cheese; those believed important include acetic, butyric, caproic and caprylic acids, hydrogen sulphide, glutamic acid, methional and carbonyl compounds. Compounds of microbial origin important in Blue cheese flavour are free fatty acids, methyl ketones and secondary alcohols; in Swiss cheese, propionic acid and proline are essential. The propionate is produced by Propionibacterium sp. by oxidation of lactate with resulting production of acetic acid and CO_2. AS

2 P 228
[Microbial flora of Roquefort Cheese, III. Lactic streptococci and leuconostocs. Influence of various contaminating micro-organisms.]
Devoyod, J. J.; Muller, M.
Lait 49 (487) 369-99 (1969) [38 ref. Fr, en] [Sta. Centrale de Recherches Laitieres et de Technologie des Produits Animaux, INRA, Jouy-en-Josas (Yvelines), France]

94 strains of lactic streptococci and 49 strains of leuconostocs were isolated from Roquefort cheese. The lactic streptococci were weak acid producing strains, acidity after 6 h at 30°C only reaching 30-35°D in 10 of 24 strains isolated before salting, 0 of 15 isolated from the surface and 5 of 20 from the centre 10 days after salting, and 0 of 35 isolated during ripening. The predominant leuconostocs were Leuc. dextranicum (23 strains) and Leuc. mesenteroides (23 strains). In the presence of a fermentable sugar, all leuconostocs produced gas from pyruvate but not from lactate. Growth of lactic streptococci and leuconostocs, acid production by lactic streptococci and gas production by leuconostocs were stimulated by contaminating strains of Str. faecalis var. liquefaciens, Saccharomyces lactis and 2 Saccharomyces, 1 Hansenula and 1 Pichia spp., but not by Str. faecalis or 2 Rhodotorula spp. [See FSTA (1969) 1 9P834 for part II.] CDA

2 P 230
[Suitability of UHT milk for growing starter cultures.]
Anderson, I.; Leesment, H.
Svenska Mejeritidningen 61 (21) 400, 402 & 404-05 (1969) [3 ref. Sv] [SMR's Centrallaboratorium, Malmö, Sweden]

2 different commercial starter cultures were sub-cultured daily for 3 wk in either UHT-treated milk (Tetra Pak) or skim-milk autoclaved for 30 min. Inocula were 1% and incubation was at 20°C for 24 h. The results of tests are given in tabular and graphic form, and cover the following: total bacterial counts; numbers of aroma-forming bacteria, Streptococcus diacetilactis and Leuconostoc citrovorum; acetoin content after 24 and 72 h; presence of acetaldehyde; citric acid contents; and pH. On the basis of the results, it is concluded that UHT milk is suitable as a substrate for starter bacteria. Advantages of this fact are discussed. HBr

2 P 247
[Enterotoxin production by Staphylococcus aureus in milk.]
Carbonero Zalduegui, P.
Revista Espanola de Lecheria 1969 (73) 113-23 (1969) [16 ref. Es] [Inst. Nacional de Investigaciones Agronomicas, Spain]

In a study of the effect of contamination by enterotoxigenic staphylococci of a lactic starter in the presence of a lactic phage, sterile reconstituted dried skim-milk was inoculated with either: (i) Streptococcus lactis, (ii) Str. lactis + homologous phage, (iii) Staph. aureus, (iv) Staph. aureus + Str. lactis, or (v) Str. lactis + phage + Staph. aureus. Total counts, made on selective and non-selective media after incubation, showed that in (iv), growth inhibition of staphylococci occurred in the presence of streptococci. In (v), counts of both organisms remained constant for 24 h but later phage-resistant streptococci again dominated. Acid production remained normal in both cases. Immunodiffusion tests detected the presence of enterotoxin in samples from (iii) and (v) but not (iv). If a lactic starter containing phage is contaminated by enterotoxigenic staphylococci, enterotoxin may be produced in the milk. No enterotoxin was detected when penicillin rather than phage was present. The penicillin concn. required to inhibit streptococcal growth also inhibits staphylococci. SAH

2 P 249
[Phage specificity in Streptococcus thermophilus.]
Sozzi, T.; Prella, G.
Annali di Microbiologia ed Enzimologia 18 (5/6) 239-42 (1969) [10 ref. It, en] [Istituto di Microbiologia Agraria e Tecnica, Univ. Catolica del Sacro Cuore, Piacenza, Italy]

Phage-host specificity was studied for 20 strains of Str. thermophilus (used in the manufacture of soft cheese) and their bacteriophages (isolated from the whey). A modification of the indicator method of Valles [see Lait (1955) **35** (345/346) 241-58] was employed for the determination. 8 strains (24, S85, S73, S133, S102, L12, S53 and Z175) were sensitive only to their specific phage; 6 strains (S215 and S221, S38 and R2, and S19 and S110) showed reciprocal lysis; the remaining strains (S161, S99, L7, TS2, 1S19, WS) showed evidence of mutation. HBr

2 P 250
[Resistance of phages of thermophilic streptococci to heat treatment of milk.]
Sozzi, T.
Annali di Mirobiologia ed Enzimologia 18 (5/6) 235-38 (1969) [6 ref. It, en] [Istituto di Microbiologia Agraria e Tecnica, Univ. Catolica del Sacro Cuore, Piacenza, Italy]

14 of the phages described in the preceding abstr. (S161, S221, S85, S215, S133, S38, S102, L12, S53, S110, S19, S73, S99 and 24) and 3 additional phages (12, F2, a) were subjected to each of the following heat treatments: 65°C for 30 min, 70°C for 10 min, 74°C for 20 sec and 90°C for 20 sec. All were inactivated at 90°C and all but 2 (F2 and a) at 70°C; none was inactivated at 74°C, the temp. most commonly used in soft cheesemaking techniques. [See also Annali Microbiol. (1966) 16 (1/2) 33.] HBr

3 B 18
In memory of I. Emanuilov. Papers on microbiology, enzymology and biochemistry. V pamet na Akademik Ignat Emanuilov. Trudove vurkhu izbrani problemi na mikrobiologiyata, enzimologiyata i biokhimiyata. [A book]
Pashev, I. (Editor)
525pp. (1969) [Numerous ref. En, Bg, De, Fr, Ru, Pl & Hu] Sofia, Bulgaria: Izdatelstvo na Bulgarskata Akademiya na Naukite. Price 5.60 Lev.

The following papers are included in this volume: "Lactic acid bacteria in Bulgarian yoghurt. III. Proteolytic activity and amino acid pattern in milk culture", by L. Nachev (pp. 51-65, Bg); "Prepackaging of meat products", by M. Lerche (pp. 129-33, De); "Total folic acid content of human and cows' milk ", by R. Karlin (pp. 135-41, Fr); "The effect of preparation of grain for milling on the microbial count, quality and stability of flour", by J. Janick, S. Stawicki & E. Kaminski (pp. 187-91, En, Paper presented at 2nd Int. Congress of Food Sci. & Technology, Warsaw); "Multiplication of Lactobacillus bulgaricus and Streptococcus thermophilus during yoghurt manufacture", by T. Girginov & Zh. Krumova (pp. 267-88, Bg); "Milk-coagulating enzyme from Bacillus mesentericus. I. Effect of pH", by M. Kondratenko, I. Bodurska & N. Nanafova (pp. 375-78, Bg). [Full abstracts of the papers on pp. 51, 135, 267 and 375 are also appearing in FSTA.] JMD

3 P 308
[Method for the manufacture of cheese.]
Chasov, F. V.; Krasheninin, P. F. (Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 217 201 (1969) [Ru]

The process features the addition of Bacterium linens (smear) culture, and of a mixed lactic starter consisting of Streptococcus lactis, Str. creamoris and Str. diacetilactis to cheese milk and ripening of the cheese in 2 stages. During the 1st 25-30 days the ripening is carried out under conditions favourable to the growth of both the smear flora and the lactic acid bacteria and then, after the removal of the smear, ripening proceeds for a further 10-15 days with the participation of lactic cultures only. To reduce wt. losses, the cheese after the removal of the smear, may be ripened in paraffin wax or similar coatings. Ripened cheese contains ~44% moisture, 55% fat in DM and 2-2.5% salt; it is of the soft type and contains ~30% of the total N compounds in soluble form. Improved quality, characterized by slight ammoniacal odour and softer consistency, and reduced ripening period are claimed for the process. FL

3 P 328
[Lactic acid bacteria in Bulgarian yoghurt. III. Proteolytic activity and amino acid pattern in milk culture.] (In "In memory of I. Emanuilov. Papers on microbiology, enzymology and biochemistry".) In "V pamet na Akademik Ignat Emanuilov. Trudove vurkhu izbrani problemi na mikrobiologiyata, enzimologiyata i biokhimiyata".
Nachev, L.
pp. 51-65 (1969) [25 ref. Bg, ru, en] Sofia, Bulgaria: Izdatelstvo na Bulgarskata Akademiya na Naukite [Mikrobiologicheski Inst., Sofia, Bulgaria]

125 strains of Lactobacillus bulgaricus were isolated from commercial and home-made yoghurt, and classified into 3 varieties on the basis of sugar fermentation [see part I, Izv. mikrobiol. Inst. Sof. (1966) 18 51-64]. The proteolytic activity of the 10 most characteristic of the 125 strains and of single-cell cultures of 9 others of the 125 strains, was determined by the method of Nachev & Dobreva [Izv. mikrobiol. Inst., Sof. (1967) 19 101-08]. The activity ranges were 0.0072×10^{-4} to 0.013×10^{-4} Anson units respectively, and it is concluded that the strains had only moderate proteolytic activity. The pattern of amino acid production of the 125 strains was studied in detail by the method of Miller et al. [Milchwissenschaft (1964) 19 (1) 18-25]. The 1st variety (118 strains) was characterized by presence of leucine, glutamic acid, asparagine and proline and absence of aminobutyric acid, β-alanine and tryptophan; the 2nd variety (6 strains) differed by the absence of glutamic acid; and the 3rd variety (1 strain) differed by presence of tryptophan. L. bulgaricus could not be differentiated from L. acidophilus by amino acid analysis. [See Izv. mikrobiol. Inst., Sof. (1966) 18 51-64 for part II.] SKK

3 P 329
Stimulating effect of lactobacilli on the growth of propionibacteria in cheese.
Nieuwenhof, F. F. J.; Stadhouders, J.; Hup, G.
Netherlands Milk and Dairy Journal 23 (4) 287-89 (1969) [12 ref. En] [Inst. for Dairy Res. (NIZO), Ede, The Netherlands]

Gouda-type cheeses were prepared using a starter which rapidly fermented citrate and (i) control milk, (ii) milk inoculated with $\sim 10^5$ propionibacteria/ml (mixture of 6 strains of Propionibacterium freudenreichii and 2 strains of Propionibact. pentosaceum), (iii) milk inoculated with $\sim 10^4$ lactobacilli/ml (mixture of 17 strains of Lactobacillus casei) or (iv) milk inoculated with propionibacteria + lactobacilli. After storage for 2-3 wk at 15°C followed by 3 wk at 22°C, cheeses prepared from (iv) had larger eyes than other cheeses. Contents of CO_2 (mg), acetic acid (μg equiv.) and propionic acid (μg equiv.) respectively, in cheeses prepared from the various milks were: from (i), 0.57, 13 and <0.5; from (ii), 0.84, 22 and 17; from (iii), 0.46, 16 and 0; and from (iv), 1.33, 52 and 70. Counts of propionibacteria/g were 33×10^8 in cheese from (iv) vs. 27×10^7 in that from (ii). CDA

3 P 355
Note on the total solids content of sour milk products.
Wit, J. N. de; Mulder, H.
Netherlands Milk and Dairy Journal 23 (4) 233-37 (1969) [En, nl] [Univ. of Agric., Wageningen, The Netherlands]

Compared with the corresponding sweet milk product, there was a loss of 0.2-0.3% TS in the manufacture of sour products which could be due to an increased acid content or to the bacterial fermentation. On lowering the pH of skim-milk from 6.7 to 4.45 by addition of H_2SO_4 or citric acid, no decrease in TS % was observed. Skim-milk incubated for 24 h at 30°C with Streptococcus lactis showed a 0.05% difference between the TS % of the milk and the soured product, whereas the presence of Str. diacetilactis or Leuconostoc cremoris + Str. lactis decreased the TS % by 0.13 and 0.23 respectively after 46 h. Results indicated that heterofermentative organisms producing volatile materials from TS constituents such as lactose and citric acid could significantly decrease the TS content of sour milk products. SAH

3 P 394
[Phages of lactic acid streptococci in pickled Gruzinskii cheeses.]
Lomsadze, R. N.
Molochnaya Promyshlennost' 30 (11) 13-14 (1969) [8 ref. Ru] [Tbilisskoe Otdelenie Nauchno-issled. Inst. Molochnoi Promyshlennosti, Tbilisi, USSR]

Bacteriophage against Streptococcus lactis strain 350 was detected in 25 (33%) of 76 samples of pickled Gruzinskii cheese aged from 2 days to 2 months, obtained from 4 Georgian cheese factories. Distribution among raw- and pasteurized-milk cheese was 17 of 49 and 8 of 27 cheeses respectively. SKK

3 P 395
Cherries in spreads and Cottage cheese sauce.
Hendrick, T. I.; Markakis, P.; Wagnitz, S.
Journal of Dairy Science 52 (12) 2057-59 (1969) [En] [Dept. of Food Sci., St. Univ., East Lansing, Michigan 48823, USA]

Cherry products were used with dairy products to prepare a flavoured dairy spread. 86% of the adult consumer panel nembers liked a cherry-dairy spread prepared according to the formula: cultured, fortified cream with 45% fat, 42.7 lb; cherry concentrate with 0.5% carboxymethylcellulose, 25.0 lb; sugar, 15.0 lb; salted butter, 15.0 lb; cherry flavour isolate, 2.0 lb; imitation sweet cherry, 0.3 lb; and a small amount of red colouring. A similar spread was made by replacing the cultured cream with butter. A cherry sauce was developed for utilization as a topping on creamed Cottage cheese. Carboxymethylcellulose proved satisfactory for control of the viscosity. 90% of the panel nembers liked the combination of the cherry sauce of the creamed Cottage cheese. [See also FSTA (1969) 1 11P1089.] AS

4 P 446
[Changes in vitamin C content of vitaminized milk during fermentation induced by yoghurt microflora.]
Czarnocsa-Roczniakowa, B.; Wojewodzka, M.
Zeszyty Naukowe Wyzszej Szkoly Rolniczej w Olsztynie 25 (2) 455-63 (1969) [11 ref. Pl, ru, en] [WSR, Olsztyn, Poland]

Sterile skim-milk containing 150-200 mg ascorbic acid was inoculated with 2 Streptococcus thermophilus strains [see Przem. spozyw. (1967) 21 (10) 20-23] or with Str. thermophilus and/or Lactobacillus bulgaricus (all from the Olsztyne Pure Dairy Culture Centre), and incubated for 32 h at 45°C in stoppered vessels in the absence of light. Control samples of milk were acidified with lactic acid to the acidity produced by fermentation and incubated as for inoculated samples. Results are shown graphically, and it is concluded that gradual losses of ascorbic acid, which reached ~20% after 32 h of incubation, were due mainly to prolonged effect of exposure to heat (45°C) rather than to any effects of fermentation by the added micro-organisms. Vitaminized yoghurt was prepared from 2% fat milk + 33 g dried milk/l.; the milk was pasteurized at 85°C for 10 min, cooled to 50°C, and 75 ml rose-hip syrup (114 mg ascorbic acid/100 ml) or 20 g dried rose-hip concentrate (628 mg ascorbic acid/100 g) + 33 g sucrose, followed by 5% yoghurt starter were added/l.; after coagulation in ~2.5-3.5 h at 45°C, the yoghurt was cooled to 4°C and stored for 48 h, and ascorbic acid content was determined at intervals. Tabulated results show that the slight losses (6-9%) occurred almost exclusively during the short incubation at 45° C. SKK

4 P 447
[Multiplication of Lactobacillus bulgaricus and Streptococcus thermophilus during yoghurt manufacture.](In "In memory of I. Emanuilov. Papers on microbiology, enzymology and biochemistry".) In 'V pamet na Akademik Ignat Emanuilov. Trudove vurkhu izbrani problemi na mikrobiologiyata, enzimologiyata i biokhimiyata'.
Girginov, T.; Krumova, Zh.
pp. 267-88 (1969) [19 ref. Bg, ru, en] Sofia, Bulgaria: Izdatelstvo na Bulgarskata Akademiya na Naukite [Vissh Inst. po Khranitelnai Vkusova Promishlenost, Plovdiv, Bulgaria]

Batches of milk were treated for 45 min in a Koch sterilizer, cooled to 46-48°C and divided into 2 portions. 1 portions was inoculated with (i) 1% commercial starter (acidity range, 106-160°T) and the 2nd portion with (ii)3% uncooled starter freshly prepared by adding 2% commercial starter to sterilized milk and ripening at 45°C to 32-50°T acidity. All milks were incubated at 45°C until they attained acidities of 25-80°T, and were then further held at 25°C or 45°C for up to 48 h (max. acidity, 213°T). L. bulgaricus and Str. thermophilus counts obtained at the different stages of ripening are tabulated and graphically presented, and numerous photomicrographs are included. The results are discussed in detail. Multiplication of both organisms was most rapid with (ii), both being in the logarithmic phase and continuing to multiply without a lag phase when inoculated into good quality milk; with (i), at the time of inoculation the streptococci were generally at the late stationary-early accelerated death stage, whereas the lactobacilli were in the logarithmic phase. Some strains of Str. thermophilus survived 48 h at 45°C, even when acidity rose to >200°T, but all bacteria were inactive after 5-10 days at 45°C. [See also Girginov & Krumova, Nauchni Trud. vissh Inst. Bhranit. Vkus. Prom., Plovdiv (1967) 14 (2) 17-26.] SKK

4 P 448
[Influence of freezing and of freeze-drying on the survival rate and percentage of lactic acid bacteria in bioghurt.]
Jabarit, A.
Lait 49 (488) 520-32 (1969) [10 ref. Fr, en]
[SEPIAL, Centre de Recherches et d'Essais, 92 Clichy, France]

In this study, which is a continuation of work described previously [FSTA (1969) 1 8P718], the effects of freezing and freeze-drying on Streptococcus lactis and Lactobacillus acidophilus were studied. As the freezing temp. of the bioghurt culture was lowered, the proportions of recoverable Str. lactis and L. acidophilus cells changed; at 0°C, the approx. % (from graph) were 53 and 47 respectively; at -30°C, differences were at a max., being 57 and 44 for frozen and 59 and 38 for freeze-dried cultures; at -35° and -40°C, proportions of the 2 organisms were approx. equal. Numbers of organisms recoverable after freezing or freeze-drying at 0°, -20° and -35°C respectively, were (/ml): frozen, 10^{10}, 10^{10} and 10^{9}; freeze-dried, 10^{10}, 10^{8} and 10^{8}. For maintaining max. viability of the bioghurt culture and keeping the freeze-drying cycle as short as possible, a temp. of 25°-35°C was optimum for the 3rd phase of the process. CDA

4 P 449
[Determination of content of aroma-producing bacteria in starters.]
Bhatnagar, R.
Meieriposten 58 (42) 933-35 (1969) [No]

An account of the work of G. Waes [Neth. Milk Dairy J. (1968) 22 (1/2) 29-39] on the enumeration of aroma bacteria in BD starters. Various media were examined to distinguish aroma bacteria from normal lactic streptococci and to enumerate separately Leuconostoc spp. and Streptococcus diacetilactis. The original 1% WACC medium (i) whey agar with 1% calcium lactate and 1.4% casamino acids) of Galesloot et al [Neth. Milk Dairy J. (1961) 15, 127] with incubation at 25°C/4-6 days permitted approx. enumeration of total aroma bacteria but not selective enumeration. Medium (i) with addition of 0.3 IU penicillin (ii) and incubation at 25°C for ≤ 6 days was completely selective for leuconostocs; 0.5% WAC medium (whey agar + 0.5% calcium lac (iii) with incubation at 35°C/6 days was selective for Str. diacetilactis. A modified medium (iv) of Nickels and Leesment [Milchwiss. (1964) 19 374] was found superior to (i) and permitted some selective enumeration, but not method of complete differentiation on a single plate was found. The method recommended is a first collective count on (iv) followed by selective counts on (ii) and (iii); a count on (ii) is important as leuconostoc numbers may be relatively small in BD starters. A suspension of 5% calcium citrate is added to all media. HBr

4 P 453
[Experiments on shortening curd treatment time.]
Bednarski, W.; Jakubowski, J.
Zeszyty Naukowe Wyzszej Szkoly Rolniczej w Olsztynie 25 (2) 481-90 (1969) [10 ref. Pl, ru, de] [WSR, Olsztyn, Poland]

A lab. installation is described and shown diagrammatically in which 1 l. batches of milk were put through a cheesemaking process. The standard procedure is described below, expt. variations at any stage being stated in parentheses. The milk, of 2.4% fat, was pasteurized for 30 min at 68°C, cooled with chilled water to 2° C, and 0.003% rennet preparation of 1:85 000 strength, 0.3% (or 0.6 or 0.9%)ofaStreptococcus lactis + Str. cremoris starter and 0.02% (or none or 0.04%) $CaCl_2.6H_2O$ were added. The mixture was held at 2-4°C for 18 h, heated to 26-28°C in 30 sec, and then to 30°C in 10 min, during which time coagulations took place (or customary renneting at 32°C for 30 min was used). Curd was cut within the next 2 min, drained at 30°C for 10 min (or 10-30 min) with stirring, scalded at 40° C (or 47° or 48° C) for 5 min (or 10-20 min), drained at 40°C for 5 min (or part of whey was replaced by hot water), separated from whey and formed into cheeses, which were held at 20°C for 4 h and at 12°C for 20 h (or at 20°C for 24 h). Mean results for degree of curd dehydration in 6 tests of the standard process and of each variation, are described in a tabulation. The main conclusions are that curd treatment time can satisfactorily be shortened by increasing milk acidity, cutting the curd fine, increasing scalding temp. and prolonging curd drainage at temp. suitable for lactic flora development. SKK

4 P 458
[Studies on cheesemaking. I. The importance of lactic acid streptococci in the manufacture of semi-hard cheese.] Studien über Käsereifung I. Mitteilung: Die Bedeutung der Milchsäurestreptokokken bei der Herstellung von Schnittkäse. [A review]
Wasserfall, F.
Kieler Milchwirtschaftliche Forschungsberichte 21 (4) 377-92 (1969) [76 ref. De, en, fr]
[Bundesanstalt für Milchforschung, Kiel, W. Germany]

4 P 482
Orotic acid in yoghurt.
Okonkwo, P.; Kinsella, J. E.
Journal of Dairy Science 52 (11) 1861-62 (1969) [5 ref. En] [Dept. of Food Sci., Cornell Univ., Ithaca, New York 14850, USA]

Yoghurt was prepared by a method which involved introducing equal quantities of cultures of Streptococcus thermophilus and Lactobacillus bulgaricus into warm milk and incubating the mixture for 7 h at 42°C. The product (pH 4.5) was then cooled and held at 4°C. Portions were sampled at 1-h intervals and orotic acid determined colorimetrically [see FSTA (1969) 1 10P906]. After 0, 1 and 7-h incubation, orotic acid concn. were 8.2, 6.4 and 4.6 mg/100 ml respectively. After cooling, the level of orotic acid remained constant. The decrease in orotic acid concn. during the incubation period was attributed to the metabolic activity of the Lactobacillus spp. HGO

4 P 516
[Protein degradation in cheese by lactic acid bacteria strains resistant to bacteriophage.]
Poznanski, S.; Rymaszewski, J.; Habaj, B.; Jakubowski, J.
Zeszyty Naukowe Wyzszej Szkoly Rolniczej w Olsztynie 25 (2) 257-66 (1969) [11 ref. Pl, ru, en] [WSR, Olsztyn, Poland]

Edam-type cheeses were made from batches of mi pasteurized at 75°C for 15 sec and renneted with dried Hansen rennet (2.8 g/110 l. milk). 0.5% of a culture of Streptococcus lactis 134 or 136, or Str. diacetilactis 216 or 222 (all phage resistant Polish strains) or of a mixed culture of the 4 strains was used as starter; commercial starter was used as control. The expts. were similar to those carried out previously [see XVII Int. Dairy Congr. (1966) 471-82 & 555-64] except that a quantity of whey equal to 25% of the original milk was removed at the draining stage and replaced by an equal quantity of water at 32°C. As a result, pH of 24 h cheeses and cheeses after salting were higher than in the earlier expt. (5.57-5.65 vs. 5.35-5.40 and 5.40-5.45 vs. 5.00-5.15 respectively). pH of ripe cheeses (3 months) was 5.8-5.9 (6.0 for mixed starter) vs. 5.15-5.28. Values for lactose and Ca contents and pH of the cheeses during manufacture and ripening are tabulated, and values for contents of soluble N, CCl_3COOH-soluble N and α-amino N (a % of total N) in ripe cheeses are presented graphically. It is concluded that proteolysis was more vigorous at the higher cheese pH achieved with the new procedure, and that to produce correct degradation of casein and desirable organoleptic properties cheese pH should be ~5.25 at 3 days and 5.65 in the ripe cheese. SKK

4 P 518
Microflora of Cheddar cheese and its influence on cheese flavour. [A review]
Fryer, T. F.
Dairy Science Abstracts 31 (9) 471-90 (1969)
[Numerous ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, England]

5 P 558
Method of manufacturing milk products.
Schuler, R. (EVOG, Etablissement für Verwaltung und Organisation)
Canadian Patent 829 840 (1969) [En]

A yoghurt-type product can be produced by adding 0.1-0.5% by wt. yeast extract to milk, which is sterilized before inoculation with 10% by wt. Lactobacillus bifidus culture and incubated at 37-40°C for 6 h. The yeast extract, which can be in the form of yeast cell juice or dried yeast reconstituted in milk, is said to shorten considerably acidification and coagulation times without detrimental effect on the taste of the product. Coagulation times can be shortened further by addition of ~1-5% by wt. glucose. L. acidophilus, L. bifidus and the slow-growing L. curvatus and L. coryniformis can also be used. HBr

5 P 559
Manufacture of fermented milk products.
Schuler, R. (EVOG, Etablissement für Verwaltung und Organisation)
United States Patent 3 480 443 (1969) [En]

Lactobacillus acidophilus, L. bifidus or an intestinal streptococcus (Str. lactis, Str. thermophilus, Str. faecalis or Str. cremoris) are inoculated individually or as mixtures into a preliminary culture medium consisting of sterile milk, 0.0005-0.09% by wt. growth medium and ~1-6% by wt. nutrient medium. The resultant culture is inoculated into sterile milk to produce a cultured milk product containing viable bacteria. Various nutrient and growth media are described, and practical examples include the manufacture of acidophilus milk, acidophilus-streptococcus milk, and a buttermilk-type beverage. HBr

5 P 562
A method for the detection of weak lipolysis of dairy lactic acid bacteria on double-layered agar plates.
Umemoto, Y.
Agricultural and Biological Chemistry 33 (11) 1651-53 (1969) [9 ref. En] [Lab. of Food Chem. and Technology, Univ., Nagoya, Japan]

In this method, 1 ml diluted culture and 15 ml nutrient agar (2% glucose, 1.5% peptone, 0.5% NaCl, 0.3% yeast abstract, 1.9% agar and 1 ml Tween 80 and 100 ml tomato juice/l.; pH 6.6) is poured onto a base layer of 1.5% agar and 5% stained olive oil (30 g olive oil stained with 50 ml aqueous solution, 1 : 1500, of Victoria and/or Nile blue, taking care to remove all free pigment) and incubated at 30° or 37°C for 5-7 days. Lipolysis is shown by clear, pale or slight blue colour on, around or below colonies. The following 15 bacterial strains examined all had lipolytic activity and gave more distinct colour changes than in earlier tests: Lactobacillus casei L-7 and L-14, L. helveticus L-53, L. plantarum L-34, Streptococcus lactis 527, Str. faecalis S-f, Leuconostoc citrovorum F-22, Pseudomonas fluorescens B-33, Ps. aeruginosa, Staphylococcus aureus 209 p, Y3Y-8 (Bacillus), HL-1(coccus) HL-9(coccus). Distinct lipolysis was shown to be present in Str. lactis and Str. cremoris, weak lipolysis in Str. faecalis and in unidentified bacteria from Cheddar cheese and starter culture.
Use of both pigments was recommended for detecting weak lipolysis. RM

5 P 564
[Evidence for a bacteriophage of Streptococcus thermophilus causing abnormal fermentation of yoghurt.]
Gelin, M.; Wurch, T.; Linder, R.
Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences, Serie D Science Naturelles 270 (2) 425-27 (1970) [4 ref. Fr]
[Lab. de Cytogenetique et d'Ecologie, Faculte des Sci., B.P. n° 36, 59-Lille-Annappes, Nord., France]

An abnormality in the fermentation of yoghurt cultures was noted at a factory in March 1969. The affected yoghurt was characterized by a slower acidification than normal. Examination of the abnormal yoghurt showed that Str. thermophilus had largely disappeared after incubation for 3 h. Evidence for the presence of a bacteriophage for Str. thermophilus is presented. Examination of the phage under the electron microscope showed that it had an exceptionally long tail. MEG

5 P 567
Studies on the proteolytic action of dairy lactic acid bacteria. IX. Autolysis and proteolytic action of Streptococcus cremoris and Lactobacillus helveticus.
Ohmiya, K.; Sato, Y.
Agricultural and Biological Chemistry 33 (11) 1628-35 (1969) [28 ref. En] [Lab. of Food Sci. and Technology, Univ., Nagoya, Japan]

Autolysis of cells of Str. cremoris and L. helveticus under starvation or nutrient-rich conditions was investigated by estimating cell-free N and DNA and proteolytic and lactic dehydrogenases (LDH) activity of cell-free solutions. When cells were grown in M/15 phosphate buffer, pH 7.0 at 35°C under starvation conditions, the ratio of soluble N : total N of suspension increased to 20% in both spp. after 3 days; soluble DNA: total DNA to 20% in Str. cremoris, to 60% in L. helveticus. After 10 days incubation, ratios became almost constant. Using α_s-casein as substrate, proteolytic activity increased rapidly during the first 3 days up to 120 μg NPN/ml filtrate, then slowly to a max. on the 6th day. Cell-free LDH activity was found after only 1 day in skim-milk culture. The finding of "ghost cells" during electron microscopic examination showed that extensive release of intracellular substances had occurred after 10 days incubation. The results are taken as evidence for the occurrence of autolysis at early stages of cultivation in nutrient-rich medium. [See FSTA (1970) 2 2P161 for part VIII.] RM

5 P 573
[Microbiology of Pecorino romano cheese. II. Physiological characteristics of thermophilic lactobacilli isolated from the whey starter.]
Ledda, A.
Scienza e Tecnica Lattiero-Casearia 20 (5) 305-14 (1969) [12 ref. It, en] [Istituto Zootecnico e Caseario per la Sardegna, Sassari, Italy]

27 strains of thermophilic lactobacilli isolated from samples of whey starter used for making Pecorino romano cheeses [see Annali Microbiol. (1967) 17 (1) 41-53], were examined by a series of cultural and biochemical tests. The results are tabulated. On the basis of these results, 14 strains were classified as Lactobacillus lactis and 5 as L. bulgaricus; the remainder could not be classified. SKK

5 P 606
[Improvements in or relating to curdled milk products.
A/S Scottex (Denmark)
British Patent 1 171 222 (1969) [En]

Pasteurized skim-milk is pumped into a jacketed fermentation tank of 5000 l. capacity, 3-4% (by vol.) of a combined Streptococcus lactis and Leuconostoc spp. starter are added and the milk is incubated and coagulated at 19-23°C for 16-18 h. After stirring, the contents of the tank are heated slowly by water circulation at ~50°C (temp. rise ⩽6-8°C during the 1st h) and the separated whey is drained off, the total amount removed corresponding to ~½ of the initial skim-milk volume. The coagulum with remaining whey in the tank is inoculated with a fresh lactic culture (2 vol./100 vol. of the original skim-milk), pasteurized cream is stirred in to increase the fat content to the level in whole milk, the product is removed from the tank, homogenized, cooled to 12-14°C and packaged in cartons. After storage for 8-16 h at ~5°C, the product is ready for distribution and consumption. The product is claimed to have a refreshing flavour and a satisfactory viscous consistency and good storage life. FL

5 P 652
[Preservation of foodstuffs by fermentation.]
Unilever NV
Netherlands Patent Application 6 818 496 (1969) [Nl]

A process for foodstuffs, such as tomatoe and yoghurt, particulary fruit yoghurt, involves inoculation by spraying the inner surfaces of containers with a culture of homo-fermentative lactic acid bacteria, filling the containers with the product which has been heated to 60-100°C and whilst it is still at this temp., sealing the containers immediately and cooling them quickly to ensure that at least part of the bacteria remain active. Subsequently the product is incubated at a suitable temperature. Cultures of Lactobacillus plantarum, arabinosus, bifidus, helveticus, bulgaricus and acidophilus, Streptococcus lactis, cremoris, thermophilus and hollandicus, and Thermobacterium lactis may be used. W&Co

5 P 677
[Evaluation of some tests for distinguishing BD, D and B starters.]
Waes, G.
Revue de l'Agriculture 22 (10) 1341-56 (1969) [7 ref. Fr, en] [Centre de Recherches Agronomiques de l'Etat, Gand, Belgium]

The quick tests of Galesloot & Hassing [Neth. Milk Dairy J. (1961) **15** (3) 225], incorporating citrate fermentation, creatine reaction and acetaldehyde production, were evaluated for their usefulness in distinguishing starters consisting of Betacoccus cremoris (B), Streptococcus diacetilactis (D) or a mixture of the two (BD). Results obtained with 16 BD-, 10 D- and 4 B-starters grown in skim-milk for 24 h at 20°C indicated that the tests are applicable. Most BD-starters were creatine-positive at 35° and 20°C; D-starters were creatine-positive at 35°C and creatine- and acetaldehyde-positive at 20°C; B-starters were citrate- and creatine-positive at 35° and 20°C. BD-starters containing only small numbers of Streptococcus diacetilactis behaved like B-starters, but they could be distinguished by subjecting them to repeated transfers of 0.01% at 30°C to stimulate growth of Str. diacetilactis prior to testing. CDA

5 P 680
Top-quality cultures made in unique plant.
Ziemba, J. V. (Editor)
Food Engineering 42 (1) 68-71 (1970) [En] [120 S. Riverside Plaza, Chicago, Illinois 60606, USA]

Concentrated bacteriophage-free starter cultures of Streptococcus lactis, Str. cremoris, Str. thermophilus, Lactobacillus bulgaricus, and Leuconostoc strains are produced under rigid quality control techniques similar to those of the pharmaceutical industry. The cultures are 'clean-room' packaged in $2\frac{1}{2}$ and 5-oz, 'rip-top' Al cans, subjected to 'flash-freezing' in liquid N_2 and stored and distributed under the same cryogenic conditions. Cultures are stated to retain >95% of their activity. BEPC

5 P 681
Relationship of metabolism of lactobacilli and pink discolouration of cheese.
Shannon, E. L.
Dissertation Abstracts International. Section B. The Sciences and Engineering 30 (3) 1190 (1969) [En] [Univ., Madison 6, Wisconsin, USA]

See FSTA (1970) 2 2P178 & 1P37 & J. Dairy Sci. (1968) **51** (6) 941 & 942.

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6 P 702
New lactic ferment.
Mar-Pha Societe d'Etudes et d'Exploitation de Marques (France)
British Patent 1 180 056 (1970) [En]

The preparation is made by incubating at ~28-40°C antibiotics-resistant lactic acid bacteria (Lactobacillus acidophilus, L. bulgaricus, Streptococcus lactis or their mixture) in a suitable medium for ~40 h to 1 wk. The bacteria are then killed and the whole culture is dried and used as supplement for maintaining or restoring biochemical equilibrium of intestinal flora during treatments with antioibtics. FI

6 P 712
Cheese starter culture.
Christensen, V. W. (Miles Laboratories Inc.)
United States Patent 3 483 087 (1969) [En]

Improvement in uniformity of activity and storage stability of cheese starter cultures is claimed by cultivating lactic-acid producing bacteria (≥1 strain of Streptococcus lactis, Str. cremoris, Str. diacetilactis together with Leuconostoc dextranicum or Leuc. citrovorum) at ~64-90°F in a buffered culture medium comprising an aqueous solution of a mixture of dried skim-milk, ammonium orthophosphate and an alkali metal orthophosphate (total amount of phosphates being ~10-22.5% by wt. of mixture). Cultivation is stopped when the change in acidity is within the range 0.85-1.05%, the culture is cooled rapidly to stop further bacterial growth, and is then maintained at a temp. of ≤-100°F, preferably ≤-300°F. HBr

6 P 715
Factors affecting survival of salmonella in Cheddar and Colby cheese.
Hargrove, R. E.; McDonough, F. E.; Mattingly, W. A.
Journal of Milk and Food Technology 32 (12) 480-84 (1969) [10 ref. En] [Dairy Products Lab., Eastern Utilization Res. and Development Div., Washington, DC 20250, USA]

4 spp. of Salmonella were added to milk prior to the manufacture of 7 experimental Colby and 65 Cheddar cheeses. Salmonellae were capable of survival in ripening cheeses for 2-9 months. The rate and amount of acid produced during cheesemaking influenced survival, the greatest decline in numbers being at pH 5.0. Using a 3% starter, an 80% reduction of the initial inoculum occured on the 1st day of storage compared to 0% reduction with a 0.5% starter. Addition of Propionibacterium shermanii and Leuconostoc spp., as starter organisms favoured the growth of salmonellae. Streptococcus cremoris proved more inhibitory than Str. lactis. Variables such as salt (1.4-2.7%), and the chemical additives diacetyl, potassium sorbate, nisin or sodium lactate had little effect on survival and neither had the degree of pasteurization of the initial milk. Factors contributing to subnormal acid production enhanced the growth and survival of salmonellae in cheese. SAH

6 P 716
The formation of bitterness in cheese: a critical evaluation.
Lawrence, R. C.; Gilles, J.
New Zealand Journal of Dairy Technology 4 (4) 189-96 (1969) [26 ref. En] [Dairy Res. Inst., Palmerston North, New Zealand]

Examination of manufacturing records at the Institute factory for 1957-69 showed that development of bitterness in Cheddar cheese was primarily dependent on the use of specific fast acid producing Streptococcus cremoris and Str. lactis starters. Whether or not bitterness then developed was determined by the ratio of salt to moisture content and, to a lesser extent and within certain salt limits, upon the pH of the cheese at 14 days. Formation of bitterness was considered likely when the ratio salt : moisture (as %) was <4.30 and also between 4.30 and 4.90 when the pH at 14 days was <4.95. Bitterness was considered unlikely when the ratio was 4.90% and also between 4.30 and 4.90% if the pH was <4.95 at 14 days. The proteolytic activity of rennet and starter in relation to pH, solubility of paracasein and salt : moisture ratio is discussed. Expt. showed that pairing of 'fast' and 'slow' starters reduced the incidence of bitterness. BEPC

6 P 746
Relationship between some chlorinated hydrocarbon insecticides and lactic culture organisms in milk.
Kim, S. C.; Harmon, L. G.
Journal of Dairy Science 53 (2) 155-60 (1970) [12 ref. En] [Dept. of Food Sci., St. Univ., East Lansing, Michigan 48823, USA]

An investigation was carried out to determine whether certain lactic acid bacteria commonly present in cultured dairy products could change aldrin, DDT or lindane, and to attempt to determine whether a typical chlorinated hydrocarbon (dieldrin) was incorporated into Lactobacillus casei during growth of this organism. Portions of sterile milk containing 1 ppm of aldrin, DDT, or lindane were inoculated with strains of Streptococcus lactis, Str. cremoris, Str. diacetilactis, and Lactobacillus casei and incubated at 32°C for 14 days. When the insecticides were extracted from the milks and the extracts analyzed by gas-liquid chromatography there was no perceptible evidence of degradation or chemical alteration of the insecticides by the lactic culture organisms. L. casei cells grown in trypticase soya broth containing 0.01 and 0.02 ppm of ^{14}C-dieldrin showed 353 and 830%, respectively, higher radioactive counts than corresponding cells grown in the absence of ^{14}C-dieldrin, suggesting that a small amount of dieldrin was either absorbed or incorporated by the cells. [See also J. Milk Fd Technol. (1968) **31** (4) 97-100.] AS

7 D 512
Laboratory control of yoghurt.
Davis, J. G.
Dairy Industries 35 (3) 139-44 (1970) [23 ref. En, fr, de, es]

In the absence of a definition in the UK legislation it is generally accepted that the compositional standards of milk (>3% fat, 8.5% SNF) should apply to natural yoghurt, and fat contents of 1-2% and ~0.05% to low fat and fat-free products, respectively. Addition of fruit, nuts, sugar, etc., is considered permissible provided that the products comply with the Labelling of Food Order; formulations containing ~15% fruit slurry and 5% sucrose are generally accepted as fruit yoghurts by public analysts. The author gives practical details for obtaining satisfactory results in examinations involving physical properties and the determination of fat, SNF, acidity and inhibitory substances, and their relevance to yoghurt manufacture. Standard methods for milk are considered to be of limited value in the bacteriological examination of yoghurt, although a coliform test applied immediately after incubation is useful as an indicator of plant hygiene standards. More emphasis is placed on methods for assessing contamination by yeasts in fruit yoghurts and the balance between Streptococcus thermophilus and Lactobacillus bulgaricus, for which methods and media suitable for laboratory control are given. Standards for coliforms, yeasts and moulds suggested for freshly made plain and fruit yoghurts (organisms/g) are: satisfactory, <1; unsatisfactory, >10; at the point of sale the same standards are suggested except for yeasts (satisfactory, <10; unsatisfactory, >100). BEPC

7 P 855
[Study of microbial flora in cheese of Saint-Paulin type. III. Its proteolytic activity.]
Ducastelle, A.; Lenoir, J.
Lait 49 (489/490) 615-36 (1969) [18 ref. Fr, en] [Lab. de Technologie, Ecole Nat. Superieure Agronomique, Grignon (78), France]

Intracellular proteases were obtained from 4 strains of Streptococcus lactis, 2 of Str. diacetilactis, 3 of Lactobacillus plantarum, 9 of micrococci, 2 of Saccharomyces and 1 of Candida, all isolated from Saint-Paulin cheeses during ripening. Optimum pH and temp. respectively, for activity of these enzymes on casein substrate were 6.3 and 45° for streptococci, 5.5 and 45°C for lactobacilli, 7.5 and 45°C for micrococci, 6.3 and 55°C for Candida, and 7.5 and 55°C for Saccharomyces. Extracellular protease acitivty, with an optimum at pH 7.2 and 45°C was observed in a micrococcal strain, but not in the streptococci or lactobacilli. Extracellular protease systems of the 2 yeasts appeared to be identical to the intracellular systems. It is concluded that protein degradation in Saint-Paulin cheese is brought about mainly by the intracellular proteases of lactic streptococci. [See Lait (1965) **45** (448) 509-18 for part II.] CDA

7 P 860
[Presence of nisin-producing streptococci in milk for Grana cheese manufacture and their influence on the milk's microflora.]
Carini, S.; Baldini, R.
Annali di Microbiologia ed Enzimologia 19 (2) 9-17 (1969) [6 ref. It, en] [Istituto di Ind. Agrarie, Univ. degli Studi, Milan, Italy]

The activity of nisin-producing bacteria both in milk and starters was evaluated. 80 000-160 000 nisin-producing streptococci were found in milk, whereas starters contained nisin-sensitive strains of Lactobacillus helveticus, L. jugurti, L. bulgaricus, L. lactis, L. fermenti, and L. acidophilus, the first 2 spp. being predominant and also very nisin-sensitive. Nisin-producing bacteria appear to inhibit starter lactobacilli during the initial stages of cheesemaking. Methods of analysis and sensitivity data of lactobacilli to nisin (cm of inhibition zone/RU nisin) are detailed. CEB

7 P 861
[Interactions of lactobacilli with butyric acid bacteria causing cheese defects.]
Gudkov, A. V.; Alekseeva, K. P.
Molochnaya Promyshlennost' 31 (1) 25-28 (1970) [14 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Lactic acid bacteria isolated from various sources were tested for growth inhibition of cultures of Clostridium tyrobutyricum. 62 of 69 strains of streptobacteria and 1 of 66 strains of betabacteria isolated from high quality Kostroma cheese, 1 of 52 strains of streptobacteria isolated from silage, 3 of 9 strains of Lactobacillus casei and 1 of 20 strains of thermobacteria from the collection of the All-Union Inst. of Butter and Cheese Ind. proved to be inhibitory. The active strains from Kostroma cheese were identified as L. plantarum; they were present in 25% of ripe high quality Kostroma cheeses examined. [See Goudkov [Gudkov] & Sharpe, J. Dairy Res. (1966) **33** (2) 139-49.] SKK

7 P 895
Utilization of milk citrate by lactic acid bacteria and 'blowing' of film-wrapped cheese.
Fryer, T. F.; Sharpe, M. E.; Reiter, B.
Journal of Dairy Research 37 (1) 17-28 (1970) [12 ref. En]

In milk, citrate utilization was >99% in 5 days when (i) Streptococcus diacetilactis 1007 was grown alone or with either or both of (ii) Str. cremoris 924 and (iii) Lactobacillus casei B 142/c; (iii) and a mixture of (iii) + (ii) utilized 57 and 14% of the citrate respectively. When L. casei C2 and L. casei C5 were grown in milk in which (ii) had been previously grown, 94 and 64%, respectively, of the citrate was utilized after 7 days at 30°C. However, in cheeses made with (ii), citrate was preferentially retained in the curd at pressing, (concn. in curd moisture = 2.9 × that in the whey); with mixed (ii) and (i) starter the curd at pressing and from the press contained only 27 and 5%, respectively, of the citrate present in (ii) curd at these times. Cheeses were made with (ii), combinations of (i) + (ii), or with δ-gluconic acid lactone instead of starter, with and without the addition of L. casei C5, in order to examine the ability of the latter organism to produce distension of the cryovac wrapping of film-wrapped cheeses. L. casei C5 neither accelerated the decrease in cheese citra ate nor produced blowing of the film wrapping. Possible reasons for this behaviour are discussed. BEPC

7 P 901
The effect of starter micro-organisms on the manufacture and ripening of selected Italian cheeses.
Harper, W. J.
Milchwissenschaft 25 (1) 14-18 (1970) [2 ref. En, de] [Dept. of Dairy Technology, Agric. Expt. Sta., Columbus, Ohio, USA]

Lactobacillus bulgaricus, L. lactis, Streptococcus thermophilus and a mycoderm, typical starter organisms isolated from Romano or Provolone cheese, were used to determine their individual or combined effects on cheese manufacture and ripening. With a curd of pH 5.3 before adding to hot water, difficulties in cheese surface closure and increased fat losses were noted during Provolone curd moulding when L. lactis or mycoderm were used individually. L. lactis combined with L. bulgaricus or the Streptococcus reduced these losses. The best flavour development was in cheeses made using starters of the 2 lactobacilli and the Streptococcus carried separately and combined in the vat. The presence of a mycoderm produced deterioration in flavour development and cheese quality after 3-4 months ripening. SAH

7 P 929
Microbial flavour defects in dairy products and methods for their simulation. I. Malty flavour.
Morgan, M. E.
Journal of Dairy Science 53 (3) 270-72 (1970) [17 ref. En] [Dept. of Animal Ind., Univ., Storrs, Connecticut 06268, USA]

The history, nomenclature, and the mechanism involved in the development of the malty defect caused by the metabolism of Streptococcus lactis var. maltigenes in dairy products are briefly reviewed. Flavour reference standards suitable for training judges of dairy products in recognition of this defect may be prepared either by culturing an active strain of the organism in, or more conveniently, by adding ~0.34 ppm of high-purity 3-methylbutanal to, good-quality homogenized pasteurized milk. A simple procedure for preparation of an aldehyde solution in 1,2-propanediol carrier suitable for this purpose is described. AS

7 P 931
[Ca, P, K, Na and lactose contents of cows' colostrum.]
Kovachev, P.
Veterinarnomeditsinski Nauki 7 (1) 107-13 (1970) [17 ref. Bg, ru, en] [Inst. po Biologiya i Patologiya na Razmnozhavaneto i Nezarazni Bolesti, Sofia, Bulgaria]

Mean values with SEM are tabulated for Ca, P, K, Na and lactose contents of 2-11 samples of colostrum and milk representing each of the 1st 11 days of lactation of a total of 23 Sofia Brown cows, which calved in Nov. and Dec., and were kept under the same conditions of feeding and management. Valeus (g/100 ml) for the 1st, 2nd and 11th days of lactation respectively, were (number of samples in parentheses): Ca, 0.188 ± 0.016 (10), 0.157 ± 0.016 (12) and 0.139 ± 0.009 (5); P, 0.179 ± 0.019 (8), 0.151 ± 0.014 (12) and 0.110 ± 0.009 (3); K, 0.162 ± 0.018 (8), 0.174 ± 0.017 (10) and 0.164 ± 0.004 (2); Na, 0.112 ± 0.01 (8), 0.082 ± 0.008 (11) and 0.038 ± 0.004 (3); lactose, 2.67 ± 0.17 (9), 3.63 ± 0.26 (11) and 4.64 ± 0.32 (3). SKK

7 P 932
The fate of the microbial population of milk powder during storage. (In The microbiology of dried foods. Proceedings of the Sixth International Symposium on Food Microbiology".) [A symposium]
Planinc, F.; Milohnoja, M.
pp. 344-55 (1969) [13 ref. En] Bilthoven, The Netherlands; International Association of Microbiological Societies [Vet. Coll., Ljubljana, Yugoslavia]

The microbial populations of 47 samples of dried milk, prepared at a factory in Slovenia, were examined over a period of 12 wk storage at 18-25°C and a RH of 60-75%. There were no changes in appearance or flavour, and only slight increases in moisture content and titratable acidity. Decreases in faecal streptococci, thermophilic, thermoduric, psychrophilic, caseolytic and lipolytic micro-organisms were observed during storage, while the number of aciduric organisms, yeasts and moulds were unchanged. Salmonella were not detected and coliform bacteria were isolated from only 1 sample. Examination of 546 samples of dried milk showed that all samples complied with the new Yugoslav bacteriological standards with regard to coagulase-positive Staphylococcus aureus, sulphite-reducing clostridia and Streptococcus faecalis. 92% came up to the standards prescribed for Escherichia coli and Proteus, but only 12.8% of freshly prepared samples complied with the total bacterial count of $<10^5$/g. The bacteriological quality improved on storage so that, after 12 wk, 68% of the dried milk samples were up to the prescribed standards. MEG

7 P 933
Cultured whey product.
Peer, H. R. (Ferma Gro Corp.)
United States Patent 3 497 359 (1970) [En]

Natural whey products having 5-7% whey solids, 0.2-0.4% acidity, 2-4% sugar and a pH of 6.1-6.6 are treated with cobalt carbonate and di-ammonium phosphate and cultured with Lactobacillus acidophilus organisms which have been treated with cobalt carbonate. The resultant product is stabilized by addition of cobalt carbonate, ferrous lactate and lactic acid. IFT

7 P 934
[Some factors affecting quality and storage life of dried starters.]
Lagoda, I. V.; Bannikova, L. A.
Molochnaya Promyshlennost' 31 (2) 11-15 (1970) [11 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Expt. are described on the preparation of dried starters for acidophilus milk, soured milk, smetana and quarg from concentrates of lactic acid bacteria [see Bannikova, Pyatnitsina & Kazantseva, Molochnaya Promyshlennost' (1964) **25** (11) 39-41]. The bacteria (Lactobacillus acidophilus, Streptococcus lactis, Str. acetoinicus, Str. cremoris) were grown in a medium composed of 90% whey and 10% hydrolysed milk (buffered with sodium citrate or sodium acetate depending on type of starter), and were separated from the medium in a continuous centrifuge at ⩾12 000 g. The method that proved best for preparation of active starters with long storage life was as follows. The bacterial concentrate is mixed (1:20) with a 10% sucrose solution containing 5% sodium citrate for streptococci or 5% sodium acetate for lactobacilli, 5% gelatin solution autoclaved for 2 h at 2 atm. and 2% sodium glutamate; 1 ml portions of the mixture are dispensed into 10 ml vials, frozen in dry ice for 16-18 h and freeze-dried initially at 23-25°C and 0.08-0.1 mm Hg, followed by 1.5-2.0 h at 32-25°C (total duration of drying, 10-12 h; moisture content of dried starter, 2.2-3.6%). 20 batches of different starters prepared by this method had a survival rate of 82-92%, were easily and completely dispersible and had high activity (0.1 g portion converted 2 l. pasteurized milk into cultured milk in 6-11 h); they retained their properties for 6 months in storage at 4-6°C, reduction in viable cells being ⩽16-18%. SKK

8 B 65
Characterization of some group N streptococci.
King, N. S.; Koburger, J. A.
Journal of Dairy Science 53 (4) 403-09 (1970) [21 ref. En] [Univ., Morgantown, West Virginia 26506, USA]

184 strains of Streptococcus lactis and 20 of Str. cremoris were isolated from 18 different sources (meats, frozen vegetables, cheese, ice cream, raw milk, trough water, poultry feed) and immediately frozen at -18°C. Str. cremoris was only found in Cottage cheese and raw milk; the cheese strains were not considered wild strains, and those from raw milk did not survive frozen storage long enough to be fully characterized. Str. diacetilactis was not recovered from any of the sources examined. The wild strains of Str. lactic did not differ significantly from commercial dairy starter strains in their biochemcial characteristics, but were less susceptible to phage attack. Wild strains showed a phage susceptibility rate of 5.4%, whereas starter strains showed a rate of 23%. Most of the wild strains were only lysed by 1 phage whereas dairy starter strains were lysed by 3-5 phages. CDA

8 P 945
Germicidal property of buffalo milk.
Patel, J. D.

Journal of Food Science and Technology (Mysore) 6 (3) 209-10 (1969) [11 ref. En] [Anand Agric. Inst., Gujarat St., India]

Milk samples were collected aseptically from 6 Surati buffaloes. 2 ml of 3-h cultures of Streptococcus thermophilus or Escherichia coli, grown in sterile skim-milk, were added to 18 ml of the fresh raw buffaloes' milk and incubated at 37°C; samples were plated on tomato juice-yeast extract medium and violet red bile agar every 30 min for 4 h and colony counts made after 24 h incubation at 37°C. Fresh milk from 5 of buffaloes inhibited growth of Str.-thermophilus for 0.5-2.0 h. There was no inhibitory effect on E. coli. It is suggested that this inhibitory activity is due to the presence of lactenin in milk, and that resumption of growth after 2 h may be due to adaptation to, or destruction of the lactenin. SPT

8 P 946
New creamery is automatic.
Anon.
Food Manufacture 45 (3) 54, 58 & 60 (1970) [En]
See FSTA (1970) 2 2P152.

8 P 955
[Some characteristics of bacteria with inhibitory activity isolated from milk.]
Maida, B.; Stinchi, S.; Montelli, P.
Industrie Alimentari 9 (1) 65-67 (1970) [7 ref. It, en] [Centrale del Latte, Rome, Italy]

6 organisms of the Streptococcus lactis group and 1 of Pseudomonas aeruginosa, isolated from milks delivered to the Central Milk Plant in Rome, possessed inhibitory activity against Bacillus stearothermophilus, B. cereus, B. subtilis, Sarcina lutea and Staph. aureus. As this activity is not destroyed by treatment with penicillinase, and is also operative, for certain Str. lactis strains, against nisin-resistant B. subtilis, it does not appear to be based on production of nisin-type inhibitors. The possible influence of bacterial inhibitors on the quality of milk and milk products is briefly discussed. GTP

8 P 1033
[Manufacture of soured milk for winter use.] (In "Proceedings of the 1st conference on processing of ewes' milk. Part I.") Zbornik referatov. I. Konferencie o spracovani ovcieho mlieka. I. cast'.
Zivkovic, Z.
pp. 151-59 (1969) [8 ref. Sk] [Zilina, Czechoslovakia: Krajsky Vybor Slovenskej Vedecko-technickej Spolocnosti pre Potravinarsky Priemysel v Banskej Bystrici [Inst. za Mlekarstvo, Novi Beograd, Yugoslavia]

The manufacture of 'special' or 'winter' (zimne) soured milk was studied on 10 farms in mountainous eastern areas of Yugoslavia. Ewes' milk immediately after milking is filtered, boiled in an open kettle, allowed to cool at room temp., poured into wooden vessels (5-10 l. capacity), inoculated with 2% culture at a temp. of 30-40°C, and the vessels are covered. The next day a further quantity of similarly treated milk is added carefully to avoid excessive mixing. Further portions of milk (up to 4) may be added and the full vessels are left for ~7 days during which period the milk coagulates and whey begins to separate along the walls. Further treatment includes removal of the separated whey and protection of the product against contamination with moulds, yeasts etc. The storage temp. decreased from 18-20°C in Oct. to <8°C in Dec. Lactobacillus bulgaricus and Streptococcus thermophilus were the typical lactic acid bacteria present in the product. In tests 4 months after manufacture, 10 samples made according to a traditional method, contained 27.50-30.24% TS and 14.10-17.80% fat and had acidities of 60.8-89.6°SH. Six samples were graded as having pleasant or very pleasant taste and typical odour, reminiscent of young walnuts; the consistency of the product was similar to that of cream or butter. FL

8 P 1038
[Bacteriological equilibrium in production cultures is particularly endangered in winter.]
Das bakteriologische Gleichgewicht in den Betriebskulturen ist im Winter in besonderem Masse gefährdet.
Oehen, V.
Schweizerische Milchzeitung 96 (17) 133 (1970) [De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld, Switzerland]
Winter difficulties in maintaining the desirable lactobacilli:streptococci ratio of freshly inoculated cheese milk within the range 1:5-1:10 are discussed and illustrated by examples from cheese factory practice. Use of bacteriological control measures and increased help from

8 P 1080
[Assessment of the lactic acid flora in yoghurt.]
Lucca, L.
Latte 42 (11) 801-02 (1968) [8 ref. It, en] [Istituto Chemioterapico Italiano, Milan, Italy]
A new method for the estimation of viable cell numbers of Streptococcus thermophilus and Lactobacillus bulgaricus in yoghurt is proposed. Str. thermophilus is estimated by counting all colonies on micro-assay culture agar plates after incubation for 24 h at 40°C. The numbers of L. bulgaricus are assessed by counting the medusoid colonies on trypsin digest agar plates after incubation for 72 h at 40°C. JMD

8 P 1127
[Microbial proteases and lipases in cheese ripening.]
Carini, S.
Latte 43 (3) 183-89 (1969) [11 ref. It, en] [Istituto di Industrie Agrarie, Univ., Milan, Italy]
The effect was studied of pH and temp. on the lipase and protease activities of disintegrated cells of Streptococcus bovis, Str. thermophilus (4 strains), Str. lactis (2 strains), Str. diacetilactis, Str. casei, Str. cremoris, Str. faecalis (2 strains), Lactobacillus lactis (2 strains), L. helveticus, L. acidophilus, L. bulgaricus, L. jugurti, L. rhamnosus, Micrococcus freudenreichii (2 strains), M. caseolyticus, M. conglomeratus, M. candidus, Micrococcus spp. (6 strains), and Pseudomonas fluorescens. Protease activity was estimated on casein by the increase in optical density at 275 nm of a trichloroacetic acid filtrate; lipase activity was estimated on tributyrin agar. Protease activity at 30°C was greatest at pH 4 and 5 but was still high at pH 6 for most strains; the optimum temp. at pH 7 was 30-40°C but the activity was high over the range 15-55°C. For the lipases of streptococci and lactobacilli the optima were usually pH 8 and 15-30°C, but the micrococcal lipase activity was generally higher at pH 7 and at 45°C. [See also FSTA (1969) 1 10B332.] JMD

9 P 1142
[Acidophilus drink.]
Yakult KK
Japanese Patent 5 025 70 (1970) [Ja]
Animal milk is mixed with sugars and an extract obtained from Chlorella senedesmus, and the composition inoculated with Lactobacillus acidophilus. The resulting cultured product is then flavoured. IFT

9 P 1143
[Acidophilus drink.]
Yakult KK
Japanese Patent 5 026/70 (1970) [Ja]
An acidophilus drink is prepared by culturing with Lactobacillus bifidus a milk composition containing an acidophilus-activating material such as a yeast extract or pancreatin. IFT

9 P 1144
[Acidophilus drink.]
Snowbrand Milk Products Co.
Japanese Patent 5 027/70 (1970) [Ja]
An acidophilus drink is made by the Lactobacillus bifidus culture of milk compositions containing glutathione and ascorbic acid. IFT

9 P 1155
[Taxonomy and technological importance of the lactic acid bacteria.]
Holzapfel, W. H.
South African Journal of Dairy Technology 2 (1) 31-36 (1970) [29 ref. Af, en] [Navorsinginstituut vir Vee-en Suivelkinde, Irene, Transvaal, R. of S. Africa]
A short survey of the most important characteristics of the Lactobacteriaceae is given. Determination of cell wall composition and its use as a taxonomic aid is discussed. Cell wall composition is considered particularly valuable for species-differentiation among heterofermentative species (leuconostocs, betabacteria, bifidobacteria). A few examples of false classification of commercially important lactic acid bacteria and the consequences of these are mentioned. [From En summ.] CDA

9 P 1160
[Production of a yoghurt-like cultured milk.]
Kuwabara, S.
French Patent 1 564 414 (1969) [Fr]

Cultured milk is made using a yeast culture, e.g. Kloeckera, Hanseniaspora lindneri, Brettanomyces bruxellensis, Zygosaccharomyces sake, producing aromatic substances without causing alcohol fermentation, and lactic acid bacteria, e.g. Lactobacillus acidophilus, L. casei, L. bulgaricus or Streptococcus diacetilactis. The cultured milk is mixed with additives, e.g. coffee extract, tea extract or green-tea extract, in the form of a sugar syrup and homogenized at a pressure of 30-100 kg/cm^2. In an example, 10 mg milk culture, in which Hanseniaspora lindneri has been cultivated, is added to 1 kg skim-milk or whole milk, and incubated at 25-30°C for 15-25 h. The milk is then sterilized at 100°C for 30 min, cooled, inoculated with 1 g Str. thermophilus and incubated at 25-35°C for 17-25 h until the acidity reaches 0.8-1.0%. The milk is then mixed with orange syrup and homogenized. The product is stored in a refrigerator. W&Co

9 P 1184
A rapid bioassay for penicillin residues in milk.
Cogan, T. M.; Fox, P. F.
Journal of Dairy Research 37 (2) 165-71 (1970) [15 ref. En] [Nat. Dairying Res. Centre, Fermoy, Co. Cork, R. of Ireland]

A test for penicillin residues is described, which has a sensitivity approaching that of the TTC test and can be completed within 90 min. The test is based on measurement of enzymatic coagulation time (ECT), which decreases markedly with slight decreases in pH around the normal pH of milk. ECT was measured at 37°C using bovine pepsin as enzyme source after incubation of the test milk with Streptococcus thermophilus. 0.05% yeast extract (YE) enhanced growth of Str. thermophilus in the test milk, but slightly impaired its sensitivity to penicillin, 50% inhibition occurring at penicillin levels of 0.011 IU/ml vs. 0.010 IU/ml in the absence of YE. The test finally adopted was as follows: to one 4.5-ml aliquot of the test milk was added 0.2 ml of penicillinase solution (1000 U/ml), and to another was added an equivalent vol. of water; both aliquots were inoculated with 0.25 ml of a 16-h Str. thermophilus culture containing sufficient YE to give 0.05% in the test milk, and incubated at 44°C for 75 min; ECT at 37°C was then determined. [See also FSTA (1970) 2 1P35.] CDA

9 P 1189
[Tegol sterilizing compound: - IMA test report Ep 1500.] IMA-Prüfungsbericht Ep 1500: Entkeimungsmittel Tegol.
Switzerland, Eidgenössische Forschungsanstalt für Milchwirtschaft
Schweizerische Milchzeitung 96 (42) 354 (1970) [De] [Liebefeld-Berne, Switzerland]

Tegol, an ampholytic derivative of a higher amino acid, manufactured by Th. Goldschmidt AG, Essen, W. Germany and distributed as 50% solution in propylene glycol, is intended for dairy factory sterilization of washed equipment, utensils and bottles. At 0.05, 0.1 and 0.2% concn. in water, pH of the preparation were 7.75, 7.83 and 7.90, and surface tensions were 35, 30 and 27 dyne/cm respectively. Corrosion tests by the prescribed method with a 0.2% solution at 65°C showed the following wt. losses (g/m^2/24 h): 99.5% Al, 0.12; 'Anticorodal', 0.91; galvanized iron, 0.40; Cr/Ni steel, 0.10. Sterilization tests, carried out by the prescribed method with 0.025, 0.05, 0.10 and 0.2% Tegol solutions, with or without addition of 0.3% skim-milk, on Escherichia coli, Aerobacter aerogenes, Staphylococcus aureus, Mycobacterium phlei, Streptococcus agalactiae , Serratia marcescens, Bacillus subtilis, yeast, Penicillium roqueforti and Geotrichum candidum showed that at the 0.1% concn. recommended by the (sufficient-very good, 6-point scale). Tests for manufacturer the sterilizing effect was 4--6 possible effects of Tegol residues showed cheese starter and yoghurt culture inhibition by concn. of $>$1.6 ppm, no effect of $\leqslant$6.4 ppm on butter starter and no effect of $\leqslant$64 ppm on milk renneting. It is concluded that Tegol is suitable for its intended purpose at the now recommended concn. of 0.2%. SKK

10 B 94
Casein proteolysis by streptococci and lactic bacteria.
Carini, S.; Resmini, P.; Bozzolati, M.
Scienza e Tecnica Lattiero-Casearia 20 (5) 289-304 (1969) [9 ref. En & It] [Istituto Ind. Agrarie, Univ., Milan, Italy]

The caseinolytic activity of intracellular enzyme extracts from 12 strains of streptococci and 7 strains of lactobacilli was studied using spectrophotometric and lectrophoretic techniques. All lactic acid bacteria studied possessed a caseinolytic enzyme system, although the extent and intensity of the activity varied between strains. In general, proteolysis resulted in the appearance of compound with low electrophoretic mobilities and of soluble compounds which were not precipitable by TCA, and in the gradual decrease of β-and α-casein, with a resulting increase in the γ:β ratio. Streptococcal extracts tended to cause greater increases in the soluble fraction, as indicated by optical density, than did lactobacilli, but altered the electrophoretic structure of casein to a lesser extent. However, very strong proteolytic activity during the first 24 h was observed for Lactobacillus lactis, L. casei var. rhamnosus, Streptococcus bovis and Str. diacetilactis, while the action of L. jugurti was mild. Some of the degradation products were also formed during the ripening of Taleggio cheese. MPH

10 P 1283
Studies on the proteolytic action of dairy lactic acid bacteria. /. Autolysis of lactic acid bacterial cells in aseptic rennet curd.
Ohmiya, K.; Sato, Y.
Agricultural and Biological Chemistry 34 (3) 457-63 (1970) [10 ref. En] [Lab. of Food Sci. and Technology, Faculty of Agric., Univ., Nagoya, Japan]

Preparation of aseptic rennet curd was carried out to investigate the autolysis of lactic acid bacterial cells during cheese ripening. The asepsis of these curds was effectively maintained during ripening. No change in DNA content of aseptic curd was observed during ripening. Aseptically harvested and washed cells of 48 h broth cultures of Streptococcus cremoris and Lactobacillus helveticus were sandwiched between aseptic rennet curd and the curds coated with paraffin wax. Rapid increase in cell-free DNA content of these sandwiched curds was observed during the ripening period of 6-12 days at 10°C. It appeared that both kinds of bacterial cells began to autolyse during ripening and that intracellular substances were released. Autolysed cells were clearly observed by electron microscopy. [See FSTA **2** 5P567 for part IX.] AS

10 P 1292
Characterization and classification of psychrotrophic bacteria in milk by means of temperature-gradient incubation.
Nakae, T.
Milchwissenschaft 25 (3) 161-67 (1970) [27 ref. En, de, fr] [Faculty of Agric., Univ., Okayama, Japan]

An extensive survey of psychrotrophic bacteria in milk and dairy products in Japan has been carried out over 4 yr, and some results have already been published [FSTA (1970) **2** 7B50 & 7H859 & Tohoku J. agric. Res. (1967) **18** (4) 247-55]. The present paper deals with temp. relations for growth of 456 strains of psychrotrophic bacteria isolated from 138 samples of raw and market milk, butter, cheese, ice cream and fermented milk. The strains were identified as 237 Pseudomonas, 21 Alcaligenes, 126 Achromobacter, 10 Flavobacterium, 18 coli-aerogenes group, and 44 Gram-positive bacteria including streptococci, micrococci, and bacilli. Temp. gradient incubation studies showed considerable variations in max. growth temp., although this and the lethal incubation temp. increased gradually with a rise in optimum growth temp. When incubated for 24 h, min. growth temp. ranged from 8 to 18°C regardless of the variation in other cardinal temp. On the basis of optimum, max. and lethal temp., 347 strains were classified as mesotrophic psychrotrophs and 109 as psychrotrophic mesophiles, but none as true psychrotrophs. CDA

10 P 1320
[Studies on cheese ripening. II. Selection of pure cultures of high technological value for cheese making, and large scale experiments with selected cultures.] Studien über Käsereifung. 2. Mitteilung: Selektivierung technologisch hochwertiger Reinkulturen für die Fabrikation von Käse und Erprobung ausgewählter Kulturen im Grossversuch.
Lembke, A.; Wasserfall, F.
Kieler Milchwirtschaftliche Forschungsberichte 22 (1) 63-76 (1970) [18 ref. De, en, fr] [Bundesanstalt für Milchforschung, Kiel, W. Germany]

661 strains of lactic streptococci were isolated from material obtained from 41 dairy factories as follows: 177 strains from 30 samples of ripe cheese, 222 strains from 22 samples of immature cheese and 262 strains from 40 samples of starters. The isolates were tested for proteolytic activity, and 50 strains were chosen as particularly active. (i) Several of these active strains and (ii) 1 proteolytically inactive strain were used in the Kiel Dairy Res. Inst. dairy to prepare starters for manufacture of Edam cheese. Values for organoleptic assessment, free amino acid content and presence of coliforms and anaerobic spore formers are tabulated for cheeses made using 9 (i) and (ii); cheeses made with (ii) were found distinctly inferior in all respects to those made with (i). Starters made with (i) were also issued to several cheese factories for manufacture of Tilsit, Edam, Gouda, 'Farm' and Romadur cheeses. Information about them is tabulated as for the Kiel Inst. cheeses and it is

concluded that, provided milk of suitable bacteriological quality is used, starters made from proteolytically active streptococci strains can produce highest quality ripened cheeses. See FSTA (1970) 2 4P458 for part I.] SKK

10 P 1367
[The acid-soluble nuleic acid derivatives in skim-milk inoculated with lactic acid bacteria.]
Lin, C-W.; Yoshino, U.; Tsugo, T.
Japanese Journal of Zootechnical Science 41 (3) 163-69 (1970) [13 ref. En, ja] [Faculty of Agric. Univ., Tokyo, Japan]

1 strain each of Streptococcus lactis, Str. cremoris, Str. diacetilactis, Lactobacillus acidophilus and L. bulgaricus, and 3 strains of Bacillus coagulans were examined for their ability to produce nucleotides when incubated in skim-milk at their optimum temp. for up to 14 days. Changes in pH, acidity, bacterial count and acid-soluble nucleic acid derivatives (ASND) were measured and ASND fractions were identified as described previously [FSTA (1969) 1 11P1100]. Changes in ASND were estimated as the difference in absorbancy at 260 nm between inoculated and uninoculated skim-milk. An overall increase in ASND was detected during incubation, this increase being greatest in skim-milk inoculated with Str. cremoris. During incubation with Str. lactis and Str. cremoris, orotic acid decreased while nucleotides with higher extinction coeff. (adenine, cytosine and guanosine phosphates) correspondingly increased. Levels of nucleotides detected in the skim-milk were lower than the min. required to affect the flavour of dairy products. CDA

10 P 1426
[Properties of nisin-producing and nisin-resistant starters.]
Karlikanova, S. N.; Gudkov, A. V.; Trofimova, T. I.
Molochnaya Promyshlennost' 31 (6) 6-11 (1970) [10 ref. Ru] [Vses. Nauchno-Issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Expt. carried out during 1967-68 in the All-Union Inst. of Butter and Cheese Ind. in Uglich on prevention of butyric acid fermentation in Kostroma cheese are reported. A nisin-producing starter composed of equal proportions of 5 nisin-producing strains of Streptococcus lactis (24-h cultures in sterilized milk; incubation at 30°C) was prepared on pasteurized milk. For the nisin-resistant starter, a mixture of 2 Str. lactis strains, 1 strain of Str. cremoris and 1 strain of Str. diacetilactis grown in sterilized milk at 25°C was added at 10% to milk autoclaved at 1 atm. for 15 min. Conditions of manufacture common to expt. and control cheeses were: renneting temp., 32°C; scalding temp., 40-41°C; total pressing time, 150 min; ripening temp., 10-12°C; $CaCl_2$ addition, 20 g/100 kg milk; cheese dye addition, 15 g/100 kg milk; water addition to whey during heating, 13-15%; NaCl addition, 300 g/100 kg milk. 0.5% Uglich starter (containing St. diacetilactis, Str. diacetilactis var. acetoinicus and Str. paracitrovorus) was used for (i) control cheeses and 0.3% nisin-resistant + 0.15% nisin-producing starter was used for (ii) expt. cheeses. 60-100 clostridia spores/ml milk were added to some batches of milk for both types of cheese. [continued in following abstr.] SKK

10 P 1429
[Bacterial off-flavour in Bergkäse cheese.] Ein bakteriell bedingter Abgeschmack im Bergkäse.
Kurmann, J. L.
Schweizerische Milchzeitung 96 (53) 424 (1970) [De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld, Switzerland]

A blown Bergkäse cheese with foul odour was submitted for examination by a Bergkäse cheese factory (producing daily 7-8 cheeses from 400-500 l. milk) where this defect had become a problem. Gas-forming streptococci, otherwise very closely related in properties to the Streptococcus faecalis group, were isolated in quantities of ~50 million/g cheese and constituted 70% of the total flora. Bergkäse cheeses made in the Swiss Federal Dairy Inst. from milk inoculated with cultures of the organism reproduced the off-flavour. Heavy contamination with the organism was detected throughout the afflicted dairy, and the fault disappeared there only after through cleaning of premises and equipment. SKK

10 P 1430
[Microbial flora of Roquefort cheese. V. Lactobacilli.]
Devoyod, J. J.
Lait 50 (495/496) 277-84 (1970) [17 ref. Fr, en]
[Sta. Centrale de Recherches Laitieres et de Technologie des Produits Animaux, INRA, Jouy-en-Josas (Yvelines), France]

Lactobacilli were isolated from Roquefort cheese using Rogosa and MRS media, and identified according to criteria defined by Sharpe [DSA 24 (3) 109-18]. 24 h after renneting, lactobacilli constituted ~0.1% of the total flora. At the surface, the lactobacilli increased to a max. of 370-420 million/g (~11% of the total flora) immediately before salting; total count decreased slightly during this period. After salting, the % of lactobacilli declined and constituted ~4% and 1% of the flora 25 and 100 days, respectively, after renneting. At the centre of the cheese, lactobacilli reached max. numbers (320-450 million/g, ~10-13% of the total flora) just before salting, but total count then declined more rapidly than lactobacillus count and lactobacilli constituted ~34% of the flora just after salting. 100 days after renneting, % of lactobacilli in the total flora was 1.1-1.8 at the surface and 5.2-6.2 at the centre. 66 isolated strains of lactobacilli were identified as Lactobacillus casei (30 strains) and L. plantarum (36 strains); L. casei was isolated mainly before and L. plantarum after salting. [See FSTA (1970) 2 7P856 for part IV.] CDA

11 P 1440
Adsorption of lactic streptococcal bacteriophage by milk proteins.
Erskine, J. M.
Journal of Dairy Science 53 (7) 861-64 (1970) [14 ref. En] [Dairy Res. Inst., Palmerston North, New Zealand]

The effects of varying the pH of lactose/yeast/phosphate broth, whey and skim-milk media on the titration of lactic streptococcal bacteriophage suspended therein were investigated. Initial comparison at pH 5 and 6.5 showed the numbers of active bacteriophage to be lower in skim-milk than in broth and whey, the difference being most marked at pH 5 (21.1 million vs. 63.1 and 62.5 million plaque-forming units/plate); this suggests that acid-precipitable proteins are responsible for inhibition of phage in skim-milk. As pH of skim-milk was lowered from 9 to 4, there was a 78% decrease in titratable phage between pH 6.5 and 4.7, followed by a sharp increase of 85% below pH 4.7. It is suggested that at pH above 4.7 (the isoelectric point of casein), the charge on the casein micelles is such that phage particles are adsorbed by, and form a complex with, the casein, and that when homologous host bacteria are introduced into phage-containing skim-milk at these pH levels, only a proportion of the total phage would be available for adsorption on the bacteria. CDA

11 P 1475
[Studies on compositional changes of Bulgarian yoghurt stored in hermetically closed containers.]
Untersuchungen über Veränderungen der Zusammensetzung von in hermetisch geschlossenen Gefässen gelagertem bulgarischen Joghurt.
Prodanski, P.; Girginov, T.
Milchwissenschaft 25 (6) 350-53 (1970) [7 ref. De, en, fr, es] [Lehrstuhl für Technologie der Milch und Milchprodukte, Inst. für Nahrungs- und Genussmittelindustrie, Plovdiv, Bulgaria]

Yoghurt hermetically sealed and stored for 2 to 4 yr at 3-4°C or 20-25°C was found on examination to contain active cells of Streptococcus thermophilus and Lactobacillus bulgaricus and some unchanged lactose. Considerable proteolytic and lipolytic breakdown had occurred, particularly in the samples held for 4 yr. The latter, nevertheless, lacked certain of the amino acids and all of the fatty acids, monoglycerides and diglycerides present in the 2-yr old samples; but were higher in peptone. Flavour and texture were normal in the samples stored for 2 yr at 3-4°C, but flavour was somewhat bitter and syneresis marked in those held for 4 yr at 20-25°C. GTP

11 P 1481
[Culturing of thermophilic lactic acid bacteria on media neutralized with marble.]
D'yachenko, P. F.; Nassib, T.; Shchedushnov, E. V.
Molochnaya Promyshlennost 31 (6) 14-16 (1970) [Ru] [Moskovskii Tekhnologicheskii Inst. Myasnoi i Molochnoi Promyshlennosti, Moscow, USSR]

Expt. are reported on use of marble as neutralizing agent in culturing 1 strain each of Lactobacillus acidophilus and L. bulgaricus and 2 strains of Streptococcus thermophilus on a skim-milk medium. Marble was used as washed, sterilized grits added at the rate of 20-30% of milk wt. Growth (plate count), titratable acidity, pH and Ca content of cultures with or without marble were measured at intervals for 72 h. Results are shown graphically and discussed. It is concluded that neutralization with marble leads to intensification of growth and increase in biomass and that marble is more satisfactory for the purpose than chalk or NaOH. Marble is recommended for continuous culturing of thermophilic lactic acid bacteria and for preparation of cheese and cultured milk starters. SKK

11 P 1486
[Lethal effect of various thermisation temperatures on some micro-organisms important to cheesemaking.] Der Abtötungseffekt verschiedener Thermisationstermperaturen auf einige käsereitechnisch wichtige Mikroorganismen.
Oehen, V.
Schweizerische Landwirtschaftliche Forschung 9 (1) 23-39 (1970) [2 ref. De, fr, en] [Eidegenössische Forschungsanstalt für Milchwirtschaft, Liebefeld-Berne, Switzerland]

Bacterial strains, expected to be components of the cheese flora, were tested for their hat resistance using temp./time combinations practiced in the production of Swiss hard cheeses (52-58°C for 0-30 min) and at higher temp. up to those of pasteurization (64°C for 30 min). Coliforms showed the expected variations in heat resistance, some strains surviving pasteurization. Micrococci were generally more heat resistant than staphylococci and were only killed for certain by pasteurization. Streptococcus lactis showed little heat resistance but Str. thermophilus easily survived pasteurization. Temp. above 58°C appreciably reduced the numbers of propionic acid bacteria. BR

11 P 1588
Unrefrigerated dahi can keep one month.
Anon.
Indian Dairyman 21 (9) 261-62 (1969) [En]

Research work at the National Dairy Res. Inst., Bangalore has shown that dahi of long keeping quality may be made by carbonation, after cooling, of milk which has been boiled for 3-5 min. Carbon dioxide is passed at 1 lb/in^2 for 1 min into milk at 30-35°C prior to inoculation of the milk with 1.5-2% of an active starter (free of non-lactic organisms), preferably consisting of a strain of Streptococcus lactis and an aroma-producing lactic streptococcus. For higher acidities (1.5-2.0% within 1 wk) an addition of Lactobacillus plantarum or L. bulgaricus is recommended. After filling and capping in sanitized bottles the milk is left undisturbed until coagulation. Sweet dahi, sour dahi, acidophilus milk and yoghurt which could be stored at room temp. and at 30°C for110 days have been prepared. BEPC

11 P 1590
[Effect of temp. on acid production by cheese starters.]
Stadhouders, J.; Waals, C. B. van der
Algemeen Zuivelblad 63 (15) 186-88 (1970) [1 ref. Nl]

Optimum temp. for acid production by BD starters (containing Streptococcus cremoris, Str. diacetilactis and Betacoccus cremoris) and B starters (containing Str. cremoris and B. cremoris) were 33 and 30°C respectively, although there were only small differences between acid production at these 2 temp. for either type of starter. Starters incubated for 2 h at 30°C then 4½ h at 15, 20, 25, 30, 33, 36, or 40°C, produced most acid when the 2nd incubation was at 33°C; acid production was retarded at 36 and 40°C. Thus, a higher cooking temp. of 36°C, which is used to compensate for reduced drainage during pressing of Dutch-type cheeses where new types of cheese moulds (Perfora, Kadova and Laude) are employed, would retard acid production to some extent; in practise this is overcome by raiking the % of starter added to the cheese milk from 1 to 1.3%. [From En summ.] CDA

11 P 1597
Degradation of α_s-, β- and $\varkappa$-caseins by cell suspensions of lactic bacteria.
Rymaszewski, J.; Poznanski, S.
International Dairy Congress (18th, Sydney) 1E: 49 (1970) [En] [Dept. of Dairy Technology, Univ. of Agric., Olsztyn, Poland]

When washed suspensions of Streptococcus lactis and Str. diacetilactis were incubated with casein fractions dissolved in phosphate buffers at pH 7, 6, 5.6 and 5, in general, $\varkappa$-casein was the fraction most degraded by Str. lactis and β-casein by Str. diacetilactis; the latter organism was the more active at all pH values and with all casein fractions. CDA

11 P 1633
These salad dressings are really creamy.
Stone, W. K.; Large, P. M.
Food Engineering 42 (5) 79-81 (1970) [10 ref. En] [Dept. of Food Sci. & Technology, Polytechnic Inst., Blacksburg, Virginia, USA]

Fortified skim-milk (containing 16-17% SNF) was pasteurized at 85°C, cooled to 45°C, and cultured until the pH decreased to 4.0 using an active yoghurt culture of equal amounts of Streptococcus thermophilus and Lactobacillus bulgaricus to form ingredient (i) in expt. to prepare dairy food salad dressings and related products. Ingredient (ii) consisted of 62% fat raw cream which was heated to 63°C, and to which 0.1% sorbic acid and 80 ppm approved antioxidant was added before it was homogenized, flushed with N_2 (2 × for 1 min, with 15 in Hg vacuum applied for 1 min between each), and cooled to 3°C until used. Non-cream (iii) ingredients (sugar, 5% redistilled vinegar, pre-gelatinized starch, salt, stabilizer and seasoning) were mixed at 55°C in a blender operated at 19 000 rev/min and then cooled to 3°C. Slow agitation (500 rev/min) was used to add (ii) to prevent churning of the cream. The pH of the blended ingredients was adjusted to 3.9 with vinegar (12% acid) before final mixing, N_2 flushing (1 min) and packaging in 6-oz glass containers. Formula modifications were made by additions of 10% blue or Cheddar cheeses blended at 55°C with the non-fat ingredients; fat content of these products was maintained at 18% by decreasing the amount of cream. The products were tested organoleptically at 30, 60 and 90 days. The dressings had a smooth texture, creamy appearance, thick consistency and were non-pourable; there was no visible separation of liquid phase after storage for 90 days and all had good flavour after storage at 5°C for the same period. Consumer panelists indicated a preference for the expt. dressings made with cream when compared with commercial brands, but not for expt. products made using special heat-treated milk fat currently under development by USDA. BEPC

12 P 1647
The selection and use of some micro-organisms for the manufacture of fermented and acidified milk products. [A lecture]
Mocquot, G.; Hurel, C.
Journal of the Society of Dairy Technology 23 (3) 130-46 (1970) [73 ref. En] [Sta. Centrale de Recherches Laitieres et de Technologie des Produits Animaux, INRA, 78 Jouy-en-Josas, France]

This paper, presented and discussed at a joint meeting of the Society of Dairy Technology and the Society for Applied Bacteriology in London on 12 March 1970, deals with some aspects of fermented milk, acidified cream and yoghurt production. Points to be considered when selecting microbial strains, maintenance and storage of the strains, and influence on them of composition and heat treatment of milk during manufacture are discussed. Methods used in the manufacture of firm yoghurt (traditional batch technique and continuous production), stirred yoghurt, flavoured yoghurt and yoghurt with fruit are briefly described and some defects encountered in production are mentioned. A section on the medicinal use of fermented milks containing Lactobacillus acidophilus is included. CDA

12 P 1648
[Types of Lactobacillus bifidus and their biological and biochemical properties.]
Semenikhina, V. F.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27: 72-78 (1970) [23 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

12 P 1743
The growth of starter cultures in concentrated milk.
Cox, W. A.
International Dairy Congress (18th, Sydney) 1E: 131 (1970) [En] [Unigate Central Lab., London, England]

Streptococcus lactis and Str. diacetilactis grew more rapidly than Str. cremoris in concn. milk containing 36% TS; growth of all 3 strains was inhibited when TS concn. was >36%. CDA

12 P 1745
The bacteriological composition of starter: the influence of solids-not-fat content in milk.
Jensen, J. S.; Overby, A. J.
International Dairy Congress (18th, Sydney) 1E: 129 (1970) [En] [Dairy Res. Lab., Royal Vet. and Agric. Univ., Copenhagen, Denmark]

Increasing the TS content of reconstituted dried skim-milk from 9.4 to 12.4% caused an increase in Streptococcus diacetilactis + Leuconostoc citrovorum content from 75% to 94% of the flora. Addition of Mn^{2+} to the milk containing 12.4% TS caused an increase in Leuc. citrovorum at the expense of Str. cremoris. CDA

12 P 1763
Continuous produticon of lactic acid.
Marshall, K. R.
International Dairy Congress (18th, Sydney) 1E: 447 (1970) [En] [Dairy Res. Inst., Palmerston North, New Zealand]

Optimum conditions for max. acid production from lactic casein whey in a Porton-type culture vessel using a mutant of Lactobacillus bulgaricus included: temp., 46°C; pH, 5.5-6.0; and O_2, absent. High fermentation temp. avoided contamination problems due to low optimum heat treatment of whey (15-30 min at 69°C). A 2-stage process is proposed for optimum overall operation. BEPC

12 P 1768
Use of active mutants of lactic acid streptococci in margarine manufacture.
Grinevich, A. G.; Yakovlev, D. A.; Shmeleva, L. I.
International Dairy Congress (18th, Sydney) 1E: 120 (1970) [En] [Siberian Inst. of Plant Physiology and Biochemistry, Irkutsk, USSR]

Starters containing Streptococcus lactis, Str. cremoris and high diacetyl-producing mutants of Str. diacetilactis, fermented milk to a product with a clean lactic acid taste, pronounced aroma and slightly creamy consistency; they were successfully used at 8 margarine factories. CDA

12 P 1772
Automatic laboratory installation for continuous milk fermentation.
Vasiliev, N. F.; Novotelnov, N. V.; Shmeleva, L. I.; Yakovlev, D. A.
International Dairy Congress (18th, Sydney) 1E: 416 (1970) [En] [Leningrad Technological Inst. of Refrigeration Ind. USSR]

Laboratory equipment is described for continuous production of cultured milk containing Streptococcus lactis, Str. cremoris and Str. diacetilactis for margarine production. The pH is automatically controlled by varying the flow of milk into the constant volume fermentation vessel. JMD

12 P 1785
Influence of antibiotics on white brine cheese production.
Yankov, Y.
International Dairy Congress (18th, Sydney) 1E: 347 (1970) [En] [Nat. Dairy Res. Inst., Vidin, Bulgaria]

Bacteriostatic effect on 28 strains of Streptococcus lactis was found with 0.1-0.3 IU penicillin, 2 μg streptomycin, 0.3 μg tetracycline and 0.2 μg biomycin/ml. Acid production in white cheese was adversely affected by 0.05-2 IU penicillin/ml cheese milk. JMD

12 P 1789
The effect of starter cultures on the quality of Emmental cheese.
Bijok, F.; Domanska-Strzatkowska, M.
International Dairy Congress (18th, Sydney) 1E: 367 (1970) [En] [Inst. of Dairy Ind., Warsaw, Poland]

Godod quality Emmental cheese was made from pasteurized milk using 0.2% starter containing equal proportions of Streptococcus thermophilus, Lactobcillus helveticus and L. casei. IMD

12 P 1812
Development of various bacteria in Danbo cheese.
Kristensen, J. M. B.
International Dairy Congress (18th, Sydney) 1E: 363 (1970) [1 ref. En] [Dalum School of Agric. and Dairy-Farming, Hjallese, Denmark]

In Danbo cheeses manufactured using a starter containing equal quantities of 3 Streptococcus spp., Str. cremoris died out earlier than Str. lactis and Str. diacetilactis; after 40-45 days, lactobacilli predominated. CDA

12 P 1841
Influence of mutagens on diacetyl production by Streptococcus diacetilactis.
Grinevich, A. G.; Sidorova, I. N.
International Dairy Congress (18th, Sydney) 1E: 121 (1970) [En] [Inst. of Plant Physiology and Biochemistry, Irkutsk, Siberia, USSR]

Sequential exposure to 0.0034M nitrosomethylurethane (15-50 min), UV-irradiation (25-60 sec) and 1 in 2000 dilution of ethylenimine (45 min - 164h) resulted in a large proportion of Str. diacetilactis variants with increased diacetyl-producing ability. CDA

12 P 1859
A protein dairy product from slightly concentrated milk.
Bryzgin, M. I.; Popova, T. V.; Shalagina, A. M.
International Dairy Congress (18th, Sydney) 1E: 449 (1970) [En] [Ukranian Sci. Res. Inst. for Meat and Dairy Ind., Kiev, USSR]

A soft cheese, containing 13-16% soluble protein degradation products, was prepared by adding $CaCl_2$, starter (containing Streptococcus lactis, Str. thermophilus and Lactobacillus casei) and rennin to milk concentrated to 38-42% TS, giving a coagulation time of 20-30 min at 38-40°C, and pressing in special cylindrical moulds. CDA

12 P 1860
Direct and indirect methods of ultra-high-temperature sterilization of milk.
Burton, H.; Perkin, A. G.
International Dairy Congress (18th, Sydney) 1E: 177 (1970) [En] Nat. Inst. for Res. in Dairying, Shinfield, Reading, England]

The degree of protein denaturation and reduction of clotting properties were slightly higher in (i) indirectly than (ii) directly heated UHT mlk. Immediately after heating there was a strong taste preference for (ii) but after 1 wk there was a preference for (i). SPT

12 P 1866
Dynamics of the microbiological processes in the production and ripening of Kachkaval cheese from cows' milk.
Goranov, V.
International Dairy Congress (18th, Sydney) 1E: 357 (1970) [2 ref. En] [Inst. of Animal Husbandry, Kostinbrod, Bulgaria]

Washing the curd with (i) water or (ii) a 6% solution of disodium phosphate or sodium citrate increased the bacterial content of the cheese; max. counts (mainly Streptococcus thermophilus), which were reached on the 25th day of ripening, were (i) 1370 million and (ii) 1780 million vs. 870 million in control cheeses. CDA

12 P 1870
The usefulness of immune milk in phage inactivation in the dairy industry.
Strzalkowska-Domanska, M.; Brill, J.
International Dairy Congress (18th, Sydney) 1E: 133 (1970) [1 ref. En] [The Inst. of Dairy Ind., Warsaw, Poland]

Immune milk, from cows which had been injected intramuscularly with monovalent Streptococcus lactis bacteriophage + adjuvant directly before or after calving and again 3 months later, was spray-dried to give a stable preparation suitable for phage inactivation in the manufacture of dairy products. CDA

12 P 1883
Detection of "bitter" strains of lactic acid streptococci.
Klimovsky[Klimovskii], I.; Zvyagintsev, V.; Gudkov, A.; Medvedeva, Z.
International Dairy Congress (18th, Sydney) 1E: 119 (1970) [En] [All-Union Res. Inst. of the Butter and Cheese Ind., Moscow, USSR]

Curds from renneted skim-milk and skim-chalk-milk, inoculated with test strains of Streptococcus lactis and Str. cremoris, were evaluated organoleptically after incubation for 1 and 7 days at 26°C. Development of bitterness in Kostroma cheeses made from the test strains was directly correlated with bitterness detected in the 7-day test. CDA

12 P 1905
Studies of some factors affecting the viability of freeze-dried starter cultures during storage.
Sinha, R. N.; Nambudripad, V. K. N.; Dudani, A. T.
International Dairy Congress (18th, Sydney) 1E: 128 (1970) [En] [Nat. Dairy Res. Inst., Karnal, India]

Freeze-dried Streptococcus lactis survived best in 5% sodium glutamate or in skim-milk fortified with ascorbic acid, thiourea and NH_4Cl, when stored at temp. up to 30°C under vacuum or in air; reconstituted skim-milk was not a suitable medium for cultures stored in air. Survival time increased as residual moisture content of the culture decreased, and also with decrease in temp. of storage. CDA

12 P 1909
Behaviour of starters in milk with an initial high or low cell count.
Waes, G.; Belleghem, M. van
International Dairy Congress (18th, Sydney) 1E: 522 (1970) [En] [Sta. Laitiere de l'Etat, Melle, Belgium]

BD starters (containing Betacoccus cremoris and Streptococcus diacetilactis) grew equally well and produced similar amounts of acid in pasteurized milks with high (~1-2 million/ml) and low (~330 000/ml) initial cell counts. CDA

12 P 1930
Feta cheese manufacture from pasteurized cows' milk.
Morris, T. A.; McKenzie, I. J.
International Dairy Congress (18th, Sydney) 1E: 342 (1970) [En] [Queensland Dept. of Primary Ind., Brisbane, Australia]

Satisfactory characteristics were obtained by: (i) culturing with Streptococcus thermophilus and Lactobacillus bulgaricus; (ii) use of lipase preparation (14 ml/448 l.); (iii) controlling brine strength covering cheese (NaCl, 3.7-4.1% in cheese); and (iv) packing 8 oz portions in plastics pouches immediately after manufacture.

12 P 1931
The importance of lactic acid bacteria in the ripening of Camembert cheese.
Kikuchi, T.; Takafuji, S.
International Dairy Congress (18th, Sydney) 1E: 381 (1970) [En] [Res. Lab., Snow Brand Milk Products Co. Ltd., Tokyo, Japan]

In the latest stages of ripening, growth and proteolytic activity of lactic acid bacteria (particularly Streptococcus lactis and Str. cremoris) are accelerated, and casein is broken down to lower mol. wt. N-containing compounds, CDA

12 P 1935
The influence of pH and the concentration of lactic acid on the development of thermophilic lactic acid bacteria in cheese.
Haven, M. C. van der; Vos, E. A.
International Dairy Congress (18th, Sydney) 1E: 137 (1970) [En] [Agric. Univ., Wageningen, The Netherlands]

The inability of certain thermophilic lactic acid bacteria to ferment all of the lactose to lactic acid during ripening of Italico cheeses was attributed to their sensitivity to undissociated lactic acid; conversion to lactic acid ceased at pH of ~5. CDA

12 P 1948
Significant contribution of intracellular protease of lactic acid bacteria to the casein hydrolysis in cheese ripening.
Ohmiya, K.; Sato, Y.
International Dairy Congress (18th, Sydney) 1E: 387 (1970) [En] [Lab. of Food Sci. and Technology (Animal Products), Univ., Nagoya, Japan]

Apparent enzyme activities in 1 g cheese, calculated from optical density measurements of de-proteinized enzyme filtrates/casein mixtures, indicated that the extent of hydrolysis of casein by intracellular proteases of Streptococcus cremoris and Lactobacillus helveticus is similar to that of rennin. CDA

GENERAL

01 G 29
Hakko Tofu: new food from soybeans.
Anon.
Agricultural Research (Washington) 18 (3) 14 (1969) [En] [Dept. of Agric. Chem., Tokyo Univ. of Education, Japan]

A new high-protein food produced from soybeans has a smooth texture and bland flavour. It can be packaged in bars, strips or pieces of any desired size and has a protein efficiency ratio of 2.7, compared with 2.2 for plain tofu (calculated from protein intase and growth rate of rats in a 21 day period). Preparation involves precipitation of curd using 1:420 of $CaSO_4$:soymilk at 158°F, ripening with a mixture of papain pronase and bioprase and fermentation with a mixed culture of ½ Streptococcus cremoris and ½ Str. lactis to improve flavour. RM

01 H 14
The production of pito, a Nigerian fermented beverage.
Ekundayo, J. A.
Journal of Food Technology 4 (3) 217-25 (1969) [26 ref. En] [School of Biological Sci., Univ., Lagos, Nigeria]

The traditional method for preparing pito, a Nigerian fermented beverage, from maize, sorghum or a mixture of both, is described. Pito was prepared from maize in the laboratory and microbiological aspects of the process investigated. The conversion of starch to sugars during steeping and malting appears to be due partly to enzymes in the grain and partly to moulds (Penicillium spp., Rhizopus oryzae and Aspergillus sp.) present on the surface of the grain. The first stage of fermentation of the extract from the malted grain, souring, is dependent upon micro-organisms from the atmosphere and a second stage, after boiling to concentrate, on the addition of a 'starter' from a previous brew. Candida sp., Geotrichum candidum and Lactobacillus sp. appear to be important in both stages, and result in the production of lactic acid and about 3% alcohol. The production of alcohol and organic acids by inoculation of sterile extracts of malted grain by pure cultures of the above organisms was demonstrated. AS

01 H 20
[Numerical taxonomy of lactobacilli isolated from wines.]
Barre, P.
Archiv für Mikrobiologie 68 (1) 74-86 (1969) [19 ref. Fr] [Centre de Recherches Agronomiques du Midi, Montpellier, France]

01 S 40
[Method for salting meat products.]
Mikhailova, A. E.; Marushkina, V. I.
USSR Patent 244 878 (1969) [Ru]

The method is said to eliminate the inhibitory effect of pickling on the development of microflora, facilitate the isolation of metabolic products promoting a ham-like taste, improve the taste of the final product and accelerate production. The bacterial starter, such as a mixture of Streptococcus lactis, Lactobacillus plantarum, Micrococcus caseolyticus, and Achromobacter guttatus, is previously grown on a suitable medium, such as ham broth, and the salt, nitrites, nitrates and sugar are added to the culture medium. The mixture is then used for pickling. The starter is cultured at 18-20°C for 2 days, the temp. of the nutrient medium having been previously brought to 20-28°C. W&Co

2 B 17
Storage of lactic streptococci. III. Mobilization of intracellular nitrogenous compounds during starvation.
King, D. H.; Koburger, J. A.
Journal of Dairy Science 52 (11) 1715-19 (1969) [14 ref. En] [Dept. of Plant Pathology and Bact., Univ., Morgantown, West Virginia 26506, USA]

Washed cells of Streptococcus lactis 3 were stored for up to 20 days at 4°C in 0.05M phosphate buffers at pH 4.5 and 7.5. At pH 7.5, intracellular nitrogenous compounds were mobilized in response to cellular changes during storage; chemical analysis showed that protein, ribonucleic acid, and pool amino acids decreased as cell viability was maintained. Accumulation of lactic acid in the spent buffers suggested that ribose acted as the energy source, in that cellular carbohydrate levels remained constant throughout the 20 days of storage. At pH 4.5, glycolytic activity of the cells decreased rapidly as storage progressed, and the analyses indicated that endogenous repair mechanisms are inoperative at this pH. [See FSTA (1969) 1 2B41 for part II.] AS

2 J 131
A study of fermentation as a means of separating oil and protein fractions in coconut (Cocos nucifera L.).

Puertollano, C. L.; Banzon, J.; Steinkraus, K. H.
Abstracts of Papers. American Chemical Society 158: MICR 45 (1969) [En] [Coll. of Agric., Coll., Laguna, Philippines]

Factors which must be controlled to break the emulsion and liberate the oil were investigated. Coconuts available commercially vary in maturity, length of storage before processing and in response to fermentation processing. ~40% of the milks produced from individual coconuts failed to break when fermented under controlled conditions, indicating that some factor(s) responsible for coconut milk emulsion stability remained uncontrolled during fermentation. Grinding conditions exerted a profound effect on the stability of the coconut milk emulsion. The optimum dilution for rapid fermentation of coconut milk and separation of the oil and protein was 1:1 (w/v) coconut meat/water. Lactobacillus plantarum effect more rapid separation of oil than L. delbrukii. The fermentation progressed best under microaerophilic conditions at 40°C. AS

2 S 101
[Effectiveness of starter-cultures in manufacturing dry sausages from the viewpoint of taste and colour formation.]
Santa, R.; Mugra, M.
Husipar 18 (2) 78-82 (1969) [4 ref. Hu, de, ru, en] [Hus es Tejipari Föiskola, Moscow, USSR]

Conventional dry sausage was prepared: without any starter culture (i); by addition of 8-10 × 10^6 Streptococcus diacetilactis/g (ii); or addition of a similar number of Lactobacillus plantarum (iii); and by addition of the same amount of a 1:1 mixture of both (ii) and (iii) starter cultures (iv). The main chemical and microbiological data on the day of preparation (A), after 15 (B) and 30 days of storage (C) were respectively per 100 g DM: total carbonyl compounds 30.26, 44.75 and 19.45 mg (i), 30.26, 36.11 and 25.90 mg (ii), 30.26, 45.24 and 24.17 mg (iii), 30.26, 45.20 and 26.05 mg (iv); diacetyl 2.18, 2.60 and 1.22 mg (i), 2.18, 3.39 and 1.43 mg (ii), 2.18, 5.13 and 1.35 mg (iii), 2.18, 5.30 and 2.55 mg (iv); acetoin 21.20, 16.60 and 8.60 mg (i), 21.20, 24.50 and 11.90 mg (ii), 21.20, 44.50 and 13.10 mg (iii), 21.20, 11.90 and 8.50 mg (iv); fatty acid 80.2, 239.9 and 372.3 ml 0.1 N KOH (i), 80.2, 511.6 and 598.4 ml (ii), 80.2, 415.9 and 521.8 ml (iii), 80.2, 534.1 and 521.3 ml (iv); lactic acid 2004, 1785 and 1539 0.1N KOH (i), 2004, 2232 and 1883 ml (ii), 2004, 2132 and 1739 ml (iii), 2004, 2018 and 1788 ml (iv). The pH after A, B and C was respectively 5.55, 5.87 and 5.87 (i); 5.55, 4.95, and 5.05 (ii); 5.55, 4.87 and 5.00 (iii); 5.55, 4.87, and 4.85 (iv). Total bacteria count after 15 and 30 days respectively 800×10^6, 700×10^6 (i); 1000×10^6, 675×10^6 (ii); 13000×10^6, 565×10^6 (iii); 2500×10^6, 570×10^6 (iv). The occurrence of: coli-type micro organisms after 15 and 30 days respectively was + + (i), + + (ii), + — (iii), + — (iv); of Proteus-type micro-organisms was + — (i), + — (ii), + — (iii), + — (iv). The use of the 1:1 mixture of starter cultures is suggested for industrial application as a means of reduced ripening periods. IF

2 S 117
Bacterial starter cultures in sausage products.
Everson, C. W. Danner, W. E.; Hammes, P. A.
Abstracts of Papers. American Chemical Society 158: MICR 33 (1969) [En] [Merck & Co., Inc., Technical Service, Fine Chemicals Dept., Rahway, New Jersey 07065, USA]

Many producers of semi-dry sausage use either a lysophilized or frozen concentrate starter culture of Pediococcus acidilactici (originally described as P. cerevisiae) to achieve a much greater degree of uniformity of flavour, appearance and texture in about one tenth of time required for the traditional process. Starter cultures for fully dry sausage are under development. Novel meat and simulated meat products may result from the use of the starter culture technique. AS

2 S 118
Production of flavours during ripening of dry sausages.
Giolitti, G.
Abstracts of Papers. American Chemical Society 158: MICR 32 (1969) [En] [Univ., Inst. di Ispezione Degli Alimenti, Di Origine Animale, Milan, Italy]

Lipolytic micro-organisms (Micrococcaceae), and lactobacilli are important in the ripening of dry sausages. The breakdown products of neutral fats were investigated and 25 non-volatile fatty acids isolated, of which 16 were identified by gas-liquid chromatography. 7 volatile fatty acids i.e. formic, acetic, propionic, isobutyric, isovaleric and valeric were found together with 18 carbonyl compounds, 11 of which were identified. It was noted that the metabolic products of the micrococci stimulated the growth of the lactobacilli, but exerted an inhibitory effect on Gram-negative bacteria (e.g. Escherichia coli, Salmonella) some of which may cause damage during ripening or endanger consumers. AS

3 A 121
[Comparative study of methods for determination of riboflavine in foods.]
Stepanova, E. N.; Sapozhnikova, G. A.; Nefedova, R. S.
Voprosy Pitaniya 28 (5) 14-18 (1969) [7 ref. Ru, en] [Vses. Nauchno-issled. Inst. Vitaminologii Ministerstva Zdravookhraneniya SSSR, Moscow, USSR]
Samples of different foods were hydrolysed by autoclaving with HCl alone, or with HCl or H_2SO_4 followed by digestion with an enzyme preparation ('Orizin', 'Avamorin' af Soviet manufacture or Taka-diastase of Czechoslovak manufacture), or with CCl_3COOH alone. Riboflavine was determined in filtered extracts, obtained by those 3 procedures, microbiologically with Lactobacillus casei, or by a lumiflavine method, or by direct fluorometry. Mean values with SEM where relevant from the different tests are tabulated for 1-4 samples of the foods. Ranges of values (mg/100 g) for each food were: (i) dried whole milk, 1.41-1.85; (ii) dried whole egg, 1.21-1.60; (iii) freeze-dried beef, 0.32-1.40; (iv) dried brewer's yeast, 2.93-3.58; (v) peas, 0.109-0.240; (vi) coarse wheat meal, 0.03-0.92; (vii) whole wheat, 0.104-0.973. Relative merits of the different methods of preparation and analysis of the different foods are discussed. In general, there was good agreement between results by the lumiflavine method and by microbiological assay. SKK

3 J 288
Vapour analysis of fermented Spanish-type green olives by gas chromatography.
Fleming, H. P.; Etchells, J. L.; Bell, T. A.
Journal of Food Science 34 (5) 419-22 (1969) [14 ref. En] [Dept. of Food Sci., St. Univ., Raleigh, North Carolina 27607, USA]
5 major components were detected gas chromatographically in the headspace vapour (HSV) of Spanish-type green olives fermented by pure cultures of Lactobacillus plantarum, Pediococcus cerevisiae and Leuconostoc mesenteroides. 3 of these compounds were identified as acetaldehyde, methyl sulphide, and ethanol. The same compounds were present in unfermented olives but in different amounts. Olives that had undergone a natural fermentation contained the above 5 compounds, and, in addition, a varying number of other compounds. These results indicated that HSV analysis may be a rapid method for detecting volatile end products resulting from the metabolism of various micro-organisms. A high ethanol content was found in olive brines that contained a predominance of yeasts. Abnormal fermentations gave unique HSV profiles, one of which indicated a high level of 2-butanol. Methyl sulphide was found to be a major odour component of fermented as well as unfermented olives. Acetaldehyde and ethanol contributed secondarily to the odour. Primary contributions of fermentation by the above lactic acid bacteria to the flavour of olives were: (i) production of a desirable level of acidity, and (ii) utilization of fermentable sugars to the exclusion of micro-organisms which produce metabolic end products with undersirable flavour characteristics. IFT

3 S 175
Microwave processing of wieners. 1. Composition and method of preparation. 2. Effect on micro-organisms.
Watanabe, W.; Tape, N. W.
Canadian Institute of Food Technology Journal 2 (2) 64-68; (3) 104-07 (1969) [22 ref. En, fr]
[Food Res. Inst., Canada Dept. of Agric., Ottawa, Canada]

The development of a method for cooking linked wieners by passing through a microwave oven having a variable speed conveyor and a forced hot air system is considered. The microwave cooking conditions required were determined using a heat stable emulsion containing the wiener ingredients. The effect of these ingredients on the microwave absorption was determined in a batch-type oven before using the continuous process. Problems requiring solution included: wiener bursting which was prevented by removing air from the emulsion; and moisture loss with shrinkage, prevented by placing in an atm. of high humidity after cooking. A 2 stage cooking process was necessary. The quality, peeling properties and colour were equal to those of commercial wieners but the emulsion required modification to give the same composition in the finished product. A description is given of the effect of microwave cooking on the bacteria present in the product. In a study of the effect of variables during the heating process, smoking with liquid smoke and storage it was shown that the number of micro-organisms was reduced considerably during cooking, although streptococci were more resistant than the others. RPC

3 S 245
Effect of nisin on the Lactobacilli that cause greening of cured meat products.
Stankiewicz-Berger, H.
Acta Microbiologica Polonica Series B: Microbiologica Applicata 18 (3/4) 117-20 (1969) [8 ref. En, pl] [Inst. Przemyslu Miesnego, Ul. Rakowiecka 36, Warsaw, Poland]

Nisin inhibited growth and affected thermal resistance of investigated Lactobacilli strains. The most sensitive was Lactobacillus viridescens No 13, the most resistant was Lactobacillus sp. No 20. Addition of nisin (200 RU/1 g) protected frankfurters against discoloration, but only in the case when infection occurred before the thermal process. AS

4 C 89
Lactic acid bacteria.
Minoru Shirota (Kabushiki Kaisha Yakult Honsha) (Japan)
British Patent 1 167 196 (1969) [En]

Bacteria obtained from faeces of infants <6 months old and fed human milk, or from vaginal secretions, are incubated in an acid medium (pH 3.1-3.3) at a temp. of 35-40°C for 3-24 h to eliminate bacteria other than the desired lactic acid bacteria. These bacteria are then isolated, cultured, passed through human intestines in several repetitions and finally re-isolated. The major object is to obtain lactic acid bacteria which are resistant to digestive juices and will grow in the human alimentary tract. It is claimed that these bacteria may exert pronounced prophylactic and therapeutic effects against various diseases including dysentery, typhoid and infantile bacterial enteritis. FL

4 H 399
[Study of bacteria from wine. III. Application of malolactic fermentation under winemaking conditions.]
Inigo, B., Bravo, F.; Plasencia, A. M.
Revista de Agroquimica y Tecnologia de Alimentos 9 (3) 428-36 (1969) [10 ref. Es, de, en, fr]
[Inst. de Fermentaciones Industriales, Madrid, Spain]

Of 50 pure cultures obtained from samples of rose wine, claret and red wine, 38 were rods and 12 were cocci. The rods were classified by their physiological characteristics as Lactobacillus plantarum and L. brevis, the cocci as Pediococcus vini and Leuconostoc mesenteroides. Optium growth conditions established using strain 11 (L. plantarum) and strain 49 (homofermentative lactic cocci) were: temp range, 8-35°C; inhibition by SO_2, 5 days with 30 mg SO_2/l. and 30-35 days with 50 mg SO_2/l.; pH max 4.2 for strain 49, 3.8 for strain 11. Both strains grew well in a slightly aerated glucose medium. Growth of the cocci was completely inhibited at alcohol concn. >15°, malic acid in concn. >10 g/l. retarded growth, low concn. (~45 mg/l.) of acetaldehyde promoted growth of both strains. A method of achieving simultaneous malolactic and alcoholic fermentation during wine production is described. Analytical data for wine produced using this method and for a control were, respectively: alcohol 14.6, 14; pH 3.6, 3.45; total acids 4.9 g/l., 5.0 g/l.; volatile acids 0.34 g/l. 0.53 g/l.; malic acid 0 g/l.; 2.5 g/l., lactic acid 2.75 g/l. 0.5 g/l. [See FSTA (1969) 1 7H723 for part I.] RM

4 H 482
[Influence of cannabidiolic acid on micro-organisms.]
Gal, I.; Vajda, Ö.
Elelmezesi Ipar 23 (11) 336-39 (1969) [10 ref. Hu, ru, de, en] [Budapest Fovaros Vegyeszeti es Elelmiszervizsgalo Intezete, Budapest, Hungary]

Growth of Lactobacillus plantarum and Leuconostoc mesenteroides was completely inhibited by a 1:200 000 dilution of cannabidiolic acid solution in a tomato juice medium at pH 4.2. No detrimental effects on taste were observed. Heating at 60°C for 2 h did not reduce the antimicrobial activity, but at 100°C a considerable reduction was observed. A thin layer chromatographic method is described for the detection of cannabidiolic in the presence of potassium sorbate. [See also FSTA (1970) **2** 3H382.] IF

5 H 609
[Comparative study of modern disinfectants used in wine cellars.]
Sarkany, P.; Edelenyi, M.
Borgazdasag 17 (4) 135-40 (1969) [13 ref. Hu, de] [Magyar Allami Pincegazdasag, Budapest, Hungary]

The effect of various concn. of 6 disinfectants used in wine cellars for the treatment of wooden and other casks, filters, pipes, processing equipment, bottles, stoppers, bottle-washing machines and similar equipment was studied. The disinfectants were Cl-containing agents, I-containing agents, and quaternary ammonium compounds applied for 1-10 min. Test organisms used were yeasts (Brettanomyces sp., Mycoderma vini) moulds (Penicillium expansum) and bacteria (Leuconostoc mesenteroides P 60 and Lactobacillus plantarum). Besides antimicrobial activity, effects on winemaking characteristics (foaming, taste of wine) were considered. I-containing agents gave the best results. IF

4 S 284
[Bacteriological and organoleptic changes in frozen broilers and pullets during storage between -2.5 and -10°C.] Mikrobielle und sensorische Veränderungen gefrorener Brathähnchen und Poularde bei Lagerung im Temperaturbereich von -2,5 bis -10° C.
Schmidt-Lorenz, W.; Gutschmidt, J.
Fleischwirtschaft 49 (8) 1033-38 & 1041 (1969) [12 ref. De, en, fr, es it] [Botanisches Inst., Univ., Karlsruhe 7500, W. Germany]

Frozen broilers and pullets were packaged in Cryovac shrink film. The microbiological and organoleptic changes occurring in them during storage at -2.5°, -5°, -7.5°, and -10°C and for reference at -30° and 0°C were investigated. The flora in poultry frozen at -30°C for 2 wk was made up of 30% Gram-positive spp. (coryne-, brevi- and microbacteria, lactobacilli, micrococci, Gaffkya spp.) and 70% Gram-negative spp. (pseudomonads, aeromonads, Vibrio spp.) and a few yeasts. After storage for 57 wk at -30°C the number of bacteria was reduced by ~60%, the flora then consisting of 70% Gram-positive and 30% Gram-negative bacteria. At storage temp. of -2.5 to -10°C bacterial counts at first showed a decline, but after a certain (temp. dependent) time rose again. With storage at -2.5°C, the bacteria grew for 2-3 wk, but the yeasts predominated. After ~4 wk at -5°C, growth of the Gram-positive group occurred only in the beginning, the main flora consisting of yeasts. At -7.5 and -10°C, only yeast and mould growth was observed. Comparison of organoleptic changes with the microbial growth between 0° and -7.5°C indicated that these changes were induced by micro-organisms. It is recommended that broilers and pullets should not be stored at temp. above -10°C. FWJ

5 M 447
Aerobic and facultative microflora of fresh and spoiled refrigerated dough products.
Hesseltine, C. W.; Graves, D. R.; Rogers, R.; Burmeister, H. R.
Applied Microbiology 18 (5) 848-53 (1969) [11 ref. En] [Northern Regional Res. Lab., USDA, Peoria, Illinois 61604, USA]

A comparison was made of the microbial flora of fresh, non-sterile dough products held at refrigerator temp. and that of the same products which had spoiled spontaneously. Various selective media were used. Spoilage was bacterial in all but 2 cases where a yeast and Penicillium roquefortii were responsible. 1132 bacterial isolates were characterized, 92% of the isolates from spoiled products being Lactobacillaceae. Of these 53% belonged to the genus Lactobacillus and 36% to the genus Leuconostoc. 94% of the Leuconostoc isolates were Leuconostoc mesenteroides. Streptococcus comprised 3% of the total isolates. None of the isolates were faecal indicators and none were of public health significance. Buttermilk biscuits gave the highest counts, up to 200 million lactic acid bacteria/g and psychrophilic counts of 4.8 million/g in fresh products, and total counts of up to 820 million/g in spoiled products. Only the mould-spoiled sample, which had a mould count of 130 000/g, had a mould count greater than 1800/g.

6 J 562
[Comparative investigations of the antibacterial effect of various leek and cruciferous plants.] Vergleichende Untersuchungen über die antibakterielle Wirksamkeit verschiedener Lauchgewächse und Cruciferen-Arten.
Rudat, K.-D.
Qualitas Plantarum et Materiae Vegetabiles 18 (1-3) 29-43 (1969) [De, en, fr] [Zentrallab., St. Markus-Krankenhaus, Frankfurt/Main, W. Germany]

Onion juice showed weak but nasturtium (Tropaeolum majus) and garlic showed strong inhibiting effect on various test organisms, including Sreptococcus pyogenes A, Streptococcus salivarius, enterococci, Streptococcus aureus, Bacillus pseudoanthracis, Bacillus subtilis, Salmonella typhosa and paratyphi, Escherichia coli, Pseudomonas aeruginosa and Proteus vulgaris. Juices from black and white radishes, leeks and chives also showed antibacterial properties. IF

6 R 197
[Causes of and means of preventing ropiness in cooked marinaded herrings.] Untersuchungen zur Ursache und zur Vermeidung des Auftretens von Fadenziehen bei Bratheringsmarinaden.
Priebe, K.
Archiv für Lebensmittelhygiene 21 (1) 13-23 (1970) [25 ref. De] [Staatliches Veterinäramt Bremerhaven, W. Germany]

Ropy spoilage of cans of cooked marinaded herrings and investigation of causative micro-organisms are described in detail. The organisms isolated from spoilt cans were identified as Lactobacillus plantarum and, in 1 instance, Lactobacillus casei var. alactosus. The following preventive measures are advocated: hygienic treatment in the factory; can filling with $\leqslant$40 parts cooked herrings/100 parts contents; use of max. quantity of vinegar compatible with correct flavour; storage of cans at $<$10°C. SKK

6 R 200
Inhibition of Pseudomonas species by hydrogen peroxide producing lactobacilli [from seafoods and other marine source].
Price, R. J.; Lee, J. S.
Journal of Milk and Food Technology 33 (1) 13-18 (1970) [37 ref. En] [Dept. of Food Sci. and Technology, St. Univ., Corvallis, Oregon 97331, USA]

81 microbial species isolated from seafoods and other marine sources were examined to determine the extent of interactions among these species. Spot-plates, cross-plates, and concurrent growth experiments at 7, 15, 20, and 30°C indicated that Lactobacillus spp. were capable of inhibiting other micro-organisms. Lactobacillus spp. isolated from oysters and identified as L. plantarum produced a substance inhibitory to Pseudomonas, Bacillus, and Proteus spp., the most sensitive being Pseudomonas. The inhibitory substance accumulated in Lactobacillus culture media, reaching max. concn. in 4 to 5 days at 30°C. The active substance was dialysable, heat labile, and inactivated by catalase. Inhibitor production paralleled H_2O_2 formation in Lactobacillus cultures, further indicating that the observed inhibition resulted from H_2O_2 produced by lactobacilli. These findings may explain the abnormal shifts in microbial flora observed in foods where Lactobacillus spp. have outgrown the natural flora. AS

6 R 227
[Ropiness in herring marinades.] Über die Erscheinung des Fadenziehens bei Bratheringsmarinaden.
Priebe, K.
Allgemeine Fischwirtschaftszeitung 22 (1) 130-33 (1970) [8 ref. De] [Staatliches Veterinäramt, Bremerhaven, W. Germany]

15 bacterial strains (5 aerobic spore-formers, 5 micrococci and 5 lactobacilli) were isolated from ropy herring marinades. The isolated lactobacilli were also found in normal, non-ropy marinades, and the medium itself may play a role (vinegar, salt, protein and carbohydrate, pH value, buffers, bacterial accessory flora, temp.) in developing ropiness. Streptobacterium (Lactobacillus) plantarum appears to be mainly responsible for ropiness. As preventative measures, elimination of potential infections prior to sealing the cans, avoidance of dense filling of cans (i.e. a 1:1 ratio herring to brine) are suggested. Storage at temp $<$10°C is advised. IF

6 S 440
Chemical changes in lipids and sulphur-containing substances during ripening of raw sausage.
Wahlroos, Ö.; Niinivaara, F. P.
Proceedings of the European Meeting of Meat Research Workers 15 I240-51 & III60-61 (1969) [11 ref. En, de, ru] [Inst. Food Chem. and Technol., Univ., Helsinki, Finland]

Sausages were inoculated with (i) micrococci, (ii) lactobacilli or (iii) micrococci + lactobacilli; (iv control samples were not inoculated. Lipolysis, determined by alkali titration and gas chromatography, was found to be acid-specific, ester bonds of oleic, linoleic and palmitoleic acids being hydrolysed preferentially. Oxidation of lipids was assessed by determination of peroxide and TBA values. Peroxide values increased from 1.5 to 2, the increase being greatest for (ii) and least for (i). Catalase activity decreased during the first wk. of ripening; subsequently a positive correlation with peroxide value was found. Final TBA value was highest for (ii) and lowest for (iv). No correlation between carbonyl compounds produced and inoculum type was observed. Disulphide and sulphydryl contents increased during ripening, and showed a positive correlation with flavour; no correlation with inoculum type or consistency of the sausage was observed. Off-flavours in sausages inoculated with (ii) were analysed by gas chromatography, and found to be due to mercaptans and sulphides. AJDW

6 S 441
Studies on discoloration of Norwegian salami sausage.
Tjaberg, T. B.; Haugum, M.; Nurmi, E.
Proceedings of the European Meeting of Meat Research Workers 15: 138-48; (summ. III) 36-37 (1969) [11 ref. En, de, ru] [Res. Committee for Preservation of Agric. Food Products, Oslo, Norway]

Effect of lactobacilli on stability of the colorants Ponceau RR 70 8019 and Nycockin (C.I. 16255) was investigated. 50, 100 and 150 mg colorant/kg were added to a modified MRS broth containing 4% 8aCl, 0.04% nitrate and 0.1, 0.4 or 1.0% glucose, (as used in Norwegian salami). Discoloration caused by the lactobacilli was increased by addition of 200 mg ascorbic acid/kg or $\geqslant$1% sugar, but addition of catalase, haemoglobin, nitrite, micrococci, Vibrio spp. or Escherichia coli had no effect. Ponceau RR was more stable than Nycockin. In a 2nd expt, sausages containing 100 ppm Nycockin were inoculated with lactobacilli and/or micrococci. Discoloration of sausages containing lactobacilli was greatest when H_2O_2 or sugar were added; addition of micrococci or KNO_2 prevented discoloration. Use of nitrites and mixed lactobacillus and micrococcus starter cultures in the manufacture of salami is recommended. AJDW

7 H 783
Microbiological controls. [A subcommittee report]
Murphy, D.; Berger, D.; Bieranowski, L.; Cerull, M.; Cirigliano, M.; Cook, B.; Isherwood, J.; Jezukawicz, J.; Kozulis, J.; Lakios, G.; Malston, W.; Martinez, L.; Middlekauff, J.; Nelson, R.; O'Brien, T.; Overbeck, J.; Reeves, R.; Strandskov, F.; Enhel, E. van; Wedding, G.; Wilmot, J.; Wisniewski, E.; Brumsted, D.
Proceedings. American Society of Brewing Chemis 1969: 242-48 (1969) [5 ref. En] [American Society of Brewing Chemists Inc., 1201 Waukegan Rd., Glenview, Illinois 60025, USA]

W. L. nutrient medium [Proc. Am. Soc. Brew. C **1950**: 19], W. L. modified nutrient medium [Proc. Am. Soc. Brew. Chem. **1966**: 58], a special tomato juice medium, and a universal beer medium were evaluated for growth response of Lactobacillus pastorianus and Pediococcus cerevisiae on the basis of colony size, plate count, and homogeneity of colony size. In most cases it appeared that best recovery of organisms as shown by plate count was obtained on the tomato juice and universal beer media. Larger colonies were also obtained. A preference for tomato juice and universal beer media was indicated by ranking and these have been recommended for use by the subcommittee for brewery lactobacilli and pediococci. PEG

7 H 784
[A study of 250 heterofermentative strains of lactobacilli isolated from wines.]
Peynaud, E.; Sapis-Domercq, S.
Archiv für Mikrobiologie 70 (4) 348-60 (1970) [3 ref. Fr, en] [Sta. Agronomique et Oenologique, Bordeaux, France]

7 H 901
[Acidophilus drink.]
Kyoto Yakult Seizo Co. Ltd.
Japanese Patent 93/70 (1970) [Ja]

Culture media containing garlic and onion are subjected to the action of Lactobacillis acidophilus and flavoured to yield a nourishing drink. IFT

8 H 911
[Is cleaning and disinfection in a single operation Utopian?] Ist Reinigung und Desinfektion in einem Arbeitsgang Utopie?
Herman, F.
Tageszeitung für Brauerei 66 (117/118) 764-67 (1969) [4 ref. De]

Advantages and disadvantages of equipment required for automatic cleaning and disinfection are discussed. Laboratory tests were carried out to determine the suitability of various cleaning and disinfecting agents for automatic application and whether the 2 operations can be combined. Quaternary ammonium compounds, an iodophor, 1 acidic and 3 alkaline cleaning agents were used, either individually or in combination. Their effect was studied on suspensions of Saccharomyces cerevisiae, Lactobacillus pastorianus and Pediococcus cerevisiae after 1 or 10 h contact time at O and 25°C. The death rate was determined, and the results are given in tabular form. It is concluded that combined cleaning/disinfection is possible for vessels which are not highly contaminated, but that in other cases, alkaline cleaning followed by separate disinfection is necessary. TUB-IGB

8 H 927
Stimulatory effect of ethyl alcohol on growth of Lactobacillus trichodes.
Kunkee, R. E.
Bacteriological Proceedings 1970: 2 (1970) [En] [Univ., Davis, California, USA]

A rarely described wine-spoilage organism, L. trichodes, requires high concn. (15-20%) of ethyl alcohol for good growth. This has been confirmed in a strain of the organism isolated from a spoiled port wine. On Rogosa-type broth, with added ethyl alcohol (15%), the growth of the organism reached 8×10^7 cells/ml. In the absence of ethyl alcohol, the cell level reached only one-eighth of this. Propanol also stimulated growth, but high levels of glucose or arabinose did not. Results indicated the requirement for ethyl alcohol was biochemical rather than chemical in nature. No stimulatory effect was found with other alcohols tested. The stimulation by alcohol was adaptive: faster growth in presence of ethyl alcohol was found when the inoculation was made with cells grown in presence of ethyl alcohol. Similarly, in the presence of 2-propanol growth was faster with cells previously grown in presence of 2-propanol as compared to cells previously grown in ethyl alcohol. AS

8 S 674
[Influence of some ingredients in minced meat on the formation of volatile substances by Lactobacillus plantarum and Streptococcus diacetilactis.]
Mugra, M. K.; Shanta, R. I.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1969 (6) 60-62 (1969) [9 ref. Ru] [Moskovskii Tekhnologicheskii Inst. Myasnoi i Molochnoi Promyshlennosti, USSR]

The lactic acid-forming spp. L. plantarum and Str. diacetilactis have a favourable effect on the flavour of smoked products and inhibit the activity of some undesirable micro-organisms. The influence of edible salt, nitrates, nitrites and carbohydrates on the growth of the above bacteria was studied. Under certain conditions during maturing of the minced material, growth of Str. diacetilactis and L. plantarum can be enhanced. Good results can be achieved in the presence of nitrates and with a 1% addition of glucose. STI

8 S 694
[Souring of uncooked ham.]
Cantoni, C.; Bianchi, M. A.; Renon, P.; Aubert, S. d'
Archivio Veterinario Italiano 20 (5) 355-70 (1969) [14 ref. It, fr, en, de] [Istituto di Ispezione degli Alimenti di Origine Animale Uinv., Milan, Italy]

7 normal and 42 putrefied ham samples previously cured in brine by the conventional method for 16 months contained: NaCl 6.0 (normal), 6.2-6.9 mg/100 g (putrefied); NH_3 80.5, 60-133; H_2S 0.187, 0.037-0.370; CH_3SH 0.015, 0.100-0.352; volatile acids 13.3, 29.6-130; non-volatile acids 248, 298-842; carbonyls 12.4, 20-96; lactic acid 739, 350-1212; free amino acids 245, 340-577 mg/100 g. Acetic acid predominated in normal hams and propionic and butyric acids in putrefied hams. From muscle tissue of putrefied ham, Arthrobacter, Sarcina and Aerococcus spp. were isolated, in addition to organisms found in normal ham tissue. Numbers found were: micrococci 58.8×10^4 (normal), $1.6\text{-}5.3 \times 10^6$ (putrefied); coliforms 1×10^4, 500-65 000; group D streptococci 3.2×10^4, 500-15 100; halophiles and halotolerants 110×10^4, $1.7\text{-}5.6 \times 10^6$; lactobacilli 2.7×10^4, 190×10^3-99×10^4; yeasts 6.7×10^3, 5×10^2-40×10^4; total count 116×10^4, $6.6\text{-}15.7 \times 10^6$. IF

9 C 199
[Hygiene of convenience foods packaged in plastics.]
Aubert, S. d'
Archivio Veterinario Italiano 21 (1) 17-32 (1970) [5 ref. It, fr, en, de] Istituto di Ispezione degli Alimenti di Origine Animale CRIA, Montecatini-Edison, Italy]

Air contamination (total bacterial counts) and contamination of various items of equipment (total bacterial, streptococci, coliform, micrococci and lactobacilli counts), initial and after 3 h operation, were studied in 2 delicatessen factories. The following convenience foods produced in the factories were examined for bacterial contamination (same tests as for equipment) immediately after packaging and after storage for 1 month at 1-4°C: cooked ham, raw ham, mortadella, and 4 types of salami. Cooked ham and mortadella sliced for packaging in the customary way of the factories or with acetone-disinfected knives were similarly examined. The results are tabulated in detail. Examination of hands of personnel disclosed that 2 of 15 workers in 1 factory and 5 of 6 in the other carried coagulase-postiive staphylococci. The findings are discussed, and hygienic measures recommended for delicatessen factories are described. SKK

9 S 786
Effects of carbon dioxide and vacuum packaging on colour and bacterial count of meat.
Baran, W. L.; Kraft, A. A.; Walker, H. W.
Journal of Milk and Food Technology 33 (3) 77-82 (1970) [31 ref. En] [Dept. of Food Technology, St. Univ., Ames, Iowa 50010, USA]

Fresh hamburger was packaged under vacuum or air in films having different O_2 permeability and stored in a display case at 5°C for 30 days. Bacon was packaged in a laminated material, under vacuum, in air or CO_2, and similarly stored. Aerobic and anaerobic bacterial counts were made at various intervals. In addition, bacon was examined for Clostridium perfringens and lactobacilli. Colour changes also were evaluated. Bacterial numbers increased on hamburger with both packaging methods. However, growth of aerobes on vacuum-packaged meat was slower than growth on meat packaged in air. Anaerobes increased in numbers in hamburgers in evacuated packages after 3 days in storage and after 6 days in meat in unevacuated packages. Packaging bacon in CO_2 resulted in reduction of total numbers of aerobes and lactobacilli. Few Cl. perfringens were recovered. Colour retention was improved for as long as 30 days with either vacuum or CO_2 packaging, as compared with air controls. In general, growth of anaerobes occurred earlier on fresh meat packaged under vacuum than in air; the converse was true for aerobic bacteria. CO_2 inhibited bacterial growth on packaged bacon and provided good colour retention during storage. AS

9 C 213
[Potential role of enterococci in food poisoning.]
Sedova, N. N.
Voprosy Pitaniya 29 (3) 29-32 (1970) [8 ref. Ru, en] [Inst. Pitaniya AMN SSR, Moscow, USSR]

Commercial quarg from raw or pasteurized milk, quarg products with or without raisins quarg paste or mass with raisins, and home-made quarg were found to contain 1.2×10^4-4×10^6 enterococci/g, predominantly Streptococcus faecalis and Str. zymogenes. None of 10 healthy children (age 15 months-10 yr) who consumed these products showed any untoward symptoms. SKK

10 B 86
Ethylene oxide resistance of micro-organisms important in spoilage of acid and high-acid foods.
Blake, D. F.; Stumbo, C. R.
Journal of Food Science 35 (1) 26-29 (1970) [11 ref. En] [Dept. of Food Sci. and Technology, Univ., Amherst, Massachusetts 01002, USA]

Resistance values were determined for spores of (i) Bacillus coagulans (var. thermoacidurans), conidiospores of (ii) Aspergillus niger, vegetative cells of (iii) Lactobacillus brevis, (iv) Leuconostoc mesenteroides, (v) Hansenula anomala and (vi) Saccharomyces cerevisiae (var. tetrasporus) exposed to a mixture of ethylene oxide (12%) and dichlorodifluoromethane (88%). Organisms deposited on glass and paper disks were exposed at 33% RH, 30°C and a pressure to give 700 mg/l. of ethylene oxide. Spores of (i) were also exposed at 40°, 50° and 60°C. The resistance parameter D was determined to characterize the resistance of each organism displaying logarithmic death. Values of z were determined for spores of (i). The most resistant organism was (i). The spores of this organism were approx. 1.8-8 times more resistant than the vegetative cells of (iii) or (iv). Vegetative cells of (v), (vi) and conidiospores of (ii) displayed nonlogarithmic death, (ii) being the most resistant. AS

10 C 227
Formation of hydrogen peroxide by group N streptococci and its effect on their growth and metabolism.
Anders, R. F.; Hogg, D. M.; Jago, G. R.
Applied Microbiology 19 (4) 608-612 (1970) [12 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne, Parkville, Victoria 3052, Australia]

The formation of H_2O_2 by Streptococcus lactis C10 and Str. cremoris HP and 972 occurred through the action of an NADH oxidase which catalysed the oxidation of NADH by molecular oxygen. The activity of the oxidase was stimulated by addition of flavine adenine dinucleotide. Specific activities in cell-free extracts of the 3 organisms respectively (n-moles NADH oxidized/min/mg protein) were as follows: NADH oxidase (at pH 7 and 30°C), 8.0, 23.1 and 8.0; NADH peroxidase (at pH 5.5 and 30°C), 1.1, 11.4 and 2.3. The action of NADH peroxidase removed some of the H_2O_2 formed, but sufficient accumulated in the medium to inhibit the growth, respiration and viability of these organisms, and hence lactic acid production. The amount of H_2O_2 which accumulated varied among strains, and this variation was attributed to strain differences in the characteristics of NADH oxidase or peroxidase CDA

10 C 228
The influence of aerobic conditions on some aspects of the growth and metabolism of group N streptococci. [A review]
Hogg, D. M.; Jago, G. R.
Australian Journal of Dairy Technology 25 (1) 17-18 (1970) [11 ref. En] [Russell Grimwade School of Biochem., Univ., Melbourne, Australia]

See preceding abstr.

11 B 98
[Increasing nisin production of Streptococcus lactis by irradiation.]
Hylmar, B.; Teply, M.; Tesarkova, H.
Prumysl Potravin 21 (6) 186-90 (1970) [21 ref. Cs, ru, en, de] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Nisin-producing strains of Streptococcus lactis (Lactoflora strains 64, 68 and 71 were irradiated 1-4 × with 420.3 W/cm² UV light from a mercury vapour lamp or 1-4 × with 30 000 rad γ-radiation from a Co source, or combinations of both (a total of up to 4 irradiations). Values for nisin and acid production in 5 subcultures of each strain by mutants isolated after irradiation are tabulated. Irradiation generally increased nisin production and lowered acid production by strain 64 and to a lesser extent by strain 71 but had little effect on these 2 characteristics in strain 68. Effects of growth in neutralized media on nisin and acid production by the 3 strains are also tabulated. SKK

11 H 1212
Tetrad-forming cocci in ciders.
Carr, J. G.
Journal of Applied Bacteriology 33 (2) 371-79 (1970) [22 ref. En] [Long Ashton Res., Univ., Bristol, England]

A tetrad-forming coccus isolated from a ropy cider was characterized and identified as Pediococcus cerevisiae. This organism occurs both as a slime-forming and non-slime-forming strain, the former being of considerable economic importance if it grows in stored cider. Some factors affecting slime formation have been investigated and are herein reported. The question of whether the generic names Pediococcus and Streptococcus should be merged is also discussed. AS

11 J 1137
[Sensory analysis of freeze-dried products.]
Sensorische Analysen gefriergetrockneter Produkte.
Florin, U.
Industrielle Obst- und Gemüseverwertung 55 (1) 12-15 (1970) [10 ref. De]

Fresh sauerkraut was frozen at -22°C and then freeze-dried. The products were tested by sensory and chemical analysis. 3 different sauerkrauts were used: (i) made with a pure culture of Leuconostoc mesenteroides, (ii) with Lactobacillus plantarum and (iii) spontaneously fermented. The results of flavour and taste tests were the same for (i) and (ii). Fresh or deep-frozen, were preferable to freeze-dried. The latter was reported to have a rather strong hay-like off-taste. The freeze-dried product had a more sour taste than the fresh or deep-frozen product. Chemical analysis showed a higher pH and a lower total acidity for the freeze-dried sauerkraut. An explanation might be that the lower water content of the freeze-dried product causes a higher concn. of acids, and therefore a stronger taste. The consistency of the freeze-dried product was poor. Sauerkraut (iii) was tested fresh, frozen, pasteurized and freeze-dried. Taste and flavour were preferred in the latter sequence, with a marked preference for the fresh product. Cooking improved the other products; especially the freeze-dried sauerkraut which lost its off-taste and poor consistency. The loss of acetic acid during freeze-drying is probably responsible for the loss of the typical sauerkraut taste. The ascorbic acid content of frozen and freeze-dried sauerkraut was about 200 mg/l. compared to 179 mg/l. for the pasteurized and 274 mg/l. for the fresh product. JMS

11 S 1004
[Bacterial cultures producing lactic acid in the production of dry non-smoked sausage.]
Rei, M.
Myasnaya Industriya SSSR 41 (1) 37-39 (1970) [6 ref. Ru] [Moskovskii Tekhnologicheskii Inst. Myasnoi i Molochnoi Promyshlennosti, USSR]

An addition of lactic acid bacterial cultures (Streptococcus diacetilactis and Lactobacillus plantarum) to minced meat in the production of dry and non-smoked salami improves the quality by promoting the formation of volatile organic acids and aromatic substances. Microbial additions have a pronounced influence on pH values, increase the content of pyruvic and lactic acids, while the butyric acid content remains practically constant. Sausage matures 40-45 days after the culture has been added. The improved aroma is due to the reduced content of propionic acid and higher fatty acids. L. plantarum and a mixture of the 2 cultures has a most favourable influence on the flavour of the sausage. STI

12 S 1180
[Formation of H_2S and CH_3SH in deteriorated sausage and ham: action of micro-organisms.]
Bianchi, M. A.; Aubert, S. d'; Cantoni, C.
Archivio Veterinario Italiano 21 (2/3) 113-18 (1970) [10 ref. It, en, fr, de] [Istituto di Ispezione degli Alimenti di Origine Animale, Univ., Milan, Italy]

Formation of H_2S and CH_3SH by (i) 18 strains of lactobacilli, (ii), 10 strains of micrococci, (iii) 5 strains of Arthrobacter and (iv) 5 strains of Corynebacteria isolated from deteriorated sausages and hams was studied on different media. The results are tabulated. (i), (iii) and (iv) produced H_2S and CH_3SH; (ii) produced H_2S only. SKK

12 H 1350
Enzymatic removal of diacetyl from beer. II. Further studies on the use of diacetyl reductase.
Tolls, T. N.; Shovers, J.; Sandine, W. E.; Elliker, P. R.
Applied Microbiology 19 (4) 649-657 (1970) [28 ref. En] [Dept. of Microbiology, St. Univ., Corvallis, Oregon 97331, USA]

Removal of diacetyl from beer by whole cells and crude extracts of bacteria and yeasts has been studied. Whole cells of yeast and Streptococcus diacetilactis 18-16 removed diacetyl from solutions, heat-inactivated cells having no effect. Diacetyl was also removed by yeast cells in dialysis tubing but flavour panel results indicated extensive yeast autolysis during this expt. Yeast embedded in diatomaceous earth filters removed all diacetyl from solutions, with no autolysis problems. Undialysed crude extract of yeast removed diacetyl slowly from beer at its normal pH (4.1), but more rapidly at pH 5. Dialysed crude extracts of yeast destroyed diacetyl in a similar manner to Aerobacter aerogenes diacetyl reductase. Both were greatly stimulated by nicotinamide adenine dinucleotide (NADH). 1 of 4 strains of A. aerogenes had enzyme of half the specific activity of the others. Crude extracts of diacetyl reductase contained $\geqslant$3 different NADH-oxidising enzymes. NADH oxidase could be separated from diacetyl reductase by Sephadex gel chromatography. Ethyl alcohol content of beer had an influence on diacetyl reductase inhibition: 3.3% caused a 42% inhibition of the enzymes activity; 10% inhibited 69% of its activity. [See Proc. Amer. Soc. Brew. Chem. (1964): 211-16 for part I.] GECV

12 S 1204
Bacterial starter cultures in sausage products.
Everson, C. W.; Danner, W. E.; Hammes, P. A.
Journal of Agricultural and Food Chemistry 18 (4) 570-71 (1970) [7 ref. En] [Merck & Co., Inc., Rahway, New Jersey 07065, USA]

For centuries, fermented sausage has been produced, initially as a means of preservation and more recently for the particular flavour effects achieved, without real knowledge of or any rational effort to control the microbiology involved. Only within the last 20 yr has this situation changed, and today many producers of semi-dry sausage use either a lyophilized or frozen concentrate starter culture of Pediococcus acidilactici, originally described as P. cerevisiae, to achieve a much greater degree of uniformity of flavour, appearance and texture in approx. one tenth the time required for the traditional process. Starter cultures for fully dry sausage are under development and should achieve commercial status within a relatively short time. Novel meat and simulated meat products may be anticipated as a result of the use of the starter culture technique. AS

1 P 20
[Method of obtaining a milk protein product for the manufacture of processed cheese.]
Bryzgin, M. I.; Shalygina, A. M.; Yaremenko, N. F.
(Union of Soviet Socialist Republics, Ukrainskii Nauchno-issledovatel'skii Institut Myasnoi i Molochnoi Promyshlennosti)
USSR Patent 262 616 (1970) [Ru]

A pasteurized, standardized milk mixture is concentrated by evaporation (preferably to 40-42% TS), cooled and filled into larger containers in which it is cultured with a lactic starter consisting of Streptococcus lactis and Str. thermophilus (ratio 60:40). Rennet may be added at a suitable concentration to the milk after evaporation to complete culturing in 2-3 h. The aim is better utilization of milk constituents. FL

1 P 22
[Proteolytic changes in milk due to enzymes produced by lactic acid bacteria.]
Habaj, B.; Damicz, W.
Roczniki Instytutu Przemyslu Mleczarskiego 11 (5) 17-37 (1969) [23 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

Skim-milk was pasteurized at 95°C for 30 min, cooled to 38°C and inoculated with 1% of a 24-h skim-milk culture of 1 of 4 strains of lactic acid bacteria (spp. as yet not defined), or a strain of Streptococcus thermophilus, or a mixture of this strain with 1 of the lactic acid bacteria strains. The inoculated samples were incubated at 40°C until they reached a pH of 4.6 and were then stored at 2-5°C for 3 wk. They were examined after 24-h incubation and at the end of storage by electrophoresis of soluble proteins, determination of contents of soluble protein, free amino acid and amino N, formol titration and viscosity measurement. Results are tabulated, graphically shown or presented as electropherograms, and progress of proteolysis during storage is discussed in relation to the strains used. SKK

1 P 23
[Freeze-drying of lactic acid bacteria.]
Shershneva, V. I.; Lagoda, I. V.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27: 58-63 (1970) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Cultures of 5 strains of Streptococcus thermophilus and 4 strains of Str. lactis were added as 5% inoculum to sterilized (i) skim-milk, (ii) skim-milk containing 16% SNF + 1% sodium citrate, or (iii), (ii) + 2% peptone, and the preparations were distributed into 1 ml ampoules and incubated. Freeze-drying after incubation was at from -35°C (initial) to +35°C (final) and lasted 24 h; ampoules with the dried cultures were sealed, being either evacuated or not evacuated, and stored at -18°C, 3-8°C or 18-25°C. The cultures were examined, before and after drying and after 3-month storage, for viability, rate of coagulation of pasteurized milk and production of acidity and also for organoleptic properties of the cultured milk. Cultures grown in (iii) and stored after freeze-drying in evacuated ampoules at -18°C were found best. SKK

1 P 58
[Proteolytic activity of lactic acid bacteria.]
D'yachenko, P. F.; Shidlovskaya, V. P.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27 : 9-15 (1970) [23 ref. Ru]

The proteolytic action of 11 acid and aroma-forming lactobacilli and streptococci commonly used in the dairy industry is studied in media consisting of whole casein, α-casein, β-casein and the non-protein N of milk. The object was to obtain a picture of the various chemical activities and the relative suitability of these organisms for particular purposes. Proteolysis, measured by paper electrophoresis and paper chromatography, is expressed in terms of total soluble N, soluble protein and amino-acids released. Considerable differences were found in the various types of proteolytic activity of the organisms examined and in the spectrum of amino-acids they yielded. Most active as regards general proteolysis were Lactobacillus bulgaricus, L. acidophilus, L. helveticus, Streptococcus cremoris, Str. acetoinicus, and Str. thermophilus. All organisms tested, with the exception of L. acidophilus, decomposed β-casein more rapidly than α-casein. GTP

1 P 81
Fermented milk.
Kuwabara, S.
British Patent 1 197 257 (1970) [En]

A cultured milk similar to yoghurt is obtained by cultivating in milk a yeast, (e.g. Kloeckera africana Janke) capable of producing aromatic substances but very little alcohol, sterilizing the milk at 100°C for 30 min, cooling to ~30°C and incubating with a lactic starter, comprising preferably Lactobacillus acidophilus, L.casei, Streptococcus thermophilus and Str. lactis. The incubation is carried out to an acidity of 0.8-1.0%. The product may be flavoured with fruit, fruit syrup, coffee etc. It is claimed that the preliminary fermentation with the yeast improves the flavour and consistency of the product. FL

1 P 88
[Starter for cows' milk koumiss.]
Bannikova, L. A.; Lapshina, A. V.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27: 78-82 (1970) [3 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

For production of liquid starter for cows' milk koumiss, 1% fresh Lactobacillus bulgaricus and L. acidophilus cultures and a suspension of Saccharomyces lactis cells (quantity washed off with sterile water from , agar-slose test tube cultures/500 ml milk) were added to sterilized skim-milk. 20-30 ml portions of the mixture were distributed into sterile containers, incubated for 12-16 h at 26-28°C and subsequently for 3-4 h at room temp. and stored either at 3-5°C or at 18-25°C. To increase stability of the starter, the skim-milk used was either enriched to 16% SNF or supplemented with 2% glucose and with glucose oxidase and catalase at the rate of 20 units (unspecified) of each enzyme/1. Activity of the starter was tested at intervals during storage for up to 90 days. Best results were obtained with starter made with skim-milk supplement with glucose and enzymes and stored at the lower temp. This starter is recommended for koumiss manufacture, shelf life being assessed at 1 month. Trials with a dried starter did not give satisfactory results. SKK

1 P 119
[Cheese, in particular processed cheese.] Käse, im besonderen Schmelzkäse.
Lashkari, B. Z. (Unilever NV)
West German Patent Application 1 932 742 (1970) [De]

Milk, preferably with 3.5-4% fat, is pasteurized and inoculated with a starter (mixture of 35-45% lactobacilli and 55-65% streptococci) at 30-37°C and left for 16-24 h. Subsequently, Candida lipolytica cells obtained from a whey culture are added and the product is left for a further 16-24 h. Then, 0.01% rennet is mixed with the partially coagulated milk, left for 30-60 min, and the resultant curd is drained, pressed for 24-72 h, salted and made into processed cheese. The product may be consumed immediately. W&Co

1 P 215
A model for bitter peptide formation and degradation in cultured dairy products.
Sullivan, J. J.; Jago, G. R.
Australian Journal of Dairy Technology 25 (2) 111 (1970) [12 ref. En] [Russell Grimwade School of Biochem., Univ., Melbourne, Australia]

Since bitter peptides formed from casein have a cyclic amide structure, probably that of pyrrolidonecarboxylic acid formed by cyclization of N-terminal glutamine, and since the enzyme pyrrolidonyl peptidase specifically removes pyrrolidonyl residues, the authors suggest that the presence of the peptidase in 'non-bitter' strains of Group N streptococci and its absence in bitter strains provide the basis of a model for the formation and degradation of bitter peptides in cultured dairy products. Detailed investigation is in progress. SJR

1 P 228
The concentration of oleic acid in Cheddar cheese relative to loss of starter viability.
Anders, R. F.; Jago, G. R.
Australian Journal of Dairy Technology 25 (2) 68-72 (1970) [18 ref. En] [Russell Grimwade School of Biochem., Univ., Melbourne, Australia]

Cheese samples were ground with acid-washed sand, and the lipids extracted with a mixture of isopropyl alcohol: n-heptane:1N-H_2SO_4 (40:10:1). The lipid extract was concentrated under vacuum and the free fatty acids (FFA) isolated by preparative TLC, followed by elution of the FFA fraction and further TLC. The FFA were methylated and analysed by GLC. During the first 5 wk of ripening, oleic, stearic, palmitic and myristic acids accounted for 85% of the total FFA present in Cheddar cheese. There was a significant positive correlation between the concn. of oleic acid and the period of ripening. After 1 wk, the concn. of oleic acid was ~100μg/g of cheese, a level which is known to inhibit the growth of Streptococcus cremoris strain C13 [see J. Dairy Res. (1964) **31:** 81]. It is concluded that the reported early loss of viability of this strain in Cheddar cheese is due to the accumulation of oleic acid. MEG

2 G 40
R&Ds low-cost dairy-like cheese.
Ziemba, . V. (Editor)
Food Engineering 42 (8) 48-49 (1970) [En]

Processing and packaging of a low-cost cream-cheese substitute developed by Cream Products Co., Chicago, are described. Batches of H_2O, vegetable oil, and non-dairy products are pasteurized, blended, emulsified, and pumped to a temp.-controlled vat: a selected strain of Lactobacillus is added and allowed to develop for 6-8 h at room temp. within cartons to which the mix is transferred before transportation. EHR

2 P 254
[Correlation between microflora of raw milk and of milk pasteurized at different temp.]
Manu, V.; Gheorghe, V.
Industria Alimentara 20 (11) 617-19 (1969) [13 ref. Ro. en, fr, de, ru] [Inst. de Igiena, Bucharest, Roumania]

Samples were taken on 34 occasions during Sept. and Oct. from 15 000-l. tanks of raw bulk milk and corresponding samples were taken after heat treatment at 75 C or 83°C for 16 sec. Mean counts of total, proteolytic, lactic acid and coliform bacteria are tabulated for the 34 samples, which are classified into 3 groups on total count. The raw and pasteurized milks were also heat-treated at 85°C for 15 min, and numbers of surviving thermoduric micro-organisms anaerobic and aerobic spore-formers and proteolytic bacteria) are tabulated; the numbers were similar both before and after heat treatment. Determination of the thermoduric microflora is recommended as an acceptance test for raw milk for processing. SKK

2 P 257
[Incidence of enterococci in pasteurized milk.]
Ienistea, C.; Chitu, M.; Roman, A.
Industria Alimentara 20 (8) 452-53. (1969) [23 ref. Ro, en, fr, de, ru] [Inst. de Igiena, Bucharest, Roumania]

(i) 120 samples of bottled pasteurized (heat treatment at 80-95 °C for 15 sec) milk, (ii) 7 samples of milk taken directly from the pasteurizer, (iii) 4 samples taken from the pasteurized milk balance tank and (iv) 3 taken from the bottle filler were examined for presence of enterococci, using 3 selective media containing sodium azide. Results are tabulated. No enterococci were detected in (ii) but they were present in 97.5% of (i) and in all (iii) and (iv) samples, usually at $\leqslant$100/ml, but occasionally higher, particularly in summer when levels sometimes reached $>$1000/ml. Streptococcus faecalis, Str. faecalis var. liquefaciens and Str. faecium were identified among the enterococci. SKK

2 P 283
Concentrated cultures of Leuconostoc citrovorum.
Gilliland, S. E.; Anna, E. D.; Speck, M. L.
Applied Microbiology 19 (6) 890-93 (1970) [8 ref. En] [Dept. of Food Sci., St. Univ., Raleigh, North Carolina 27607, USA]

Cultures of Leuc. citrovorum (strains 3 and 28) were separately grown in broth medium (2 tryptone, 0.5% yeast extract, 1% glucose, 0.5% sodium citrate) in a fermenter with automatic pH control. The cultures were subcultured 3 × before growth in the medium, then concentrated by centrifugation and stored in liquid N_2. Max. populations obtainable occurred in cultures grown at pH 6.0-7.0; diacetyl production in milk reached a max. at pH 6.0. A taste panel expressed preference for Cottage cheese prepared using the concentrate to that prepared with normal milk cultures. There was no loss of viability or ability to produce diacetyl during storage at -196°C for 30 days. Requirement for citrate in subsequent production of diacetyl was confirmed. BEPC

2 P 284
[Mixed culturing of lactic acid bacteria with different temp. optima.]
Koroleva, N. S.; Suvorova, G. V.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27: 43-58 (1970) [10 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

7 strains of thermophilic streptococci, 6 strains of thermophilic bacilli, ii strains of Lactobacillus bulgaricus, 3 strains of a bacillus isolated from Bryndza cheese, 13 strains of Streptococcus lactis and 6 strains of Str. diacetilactis were grown at different temp. in sterilized milk, either singly or in different combinations. For mixtures of mesophilic streptococci with thermophilic bacilli, culturing was for 18, 48 or 72 h and growth, tyrosine liberation, acid production, coagulation rate and organoleptic properties were determined. Mixtures of mesophilic and thermophilic streptococci were similarly examined after incubation for 3 or 6 h. Mixed cultures held at 3-5°C were also repeatedly subcultured and examined Results are discussed with particular reference to the value of different combinations of lactic acid bacteria as starters. It is pointed out that mixed culturing at 30-35°C of mesophilic bacteria with thermophilic bacteria often results in increased growth of both and increased production of acid. SKK

2 P 285
[Changes in free amino acid contents of milk during incubation with thermophilic lactic acid bacteria.]
Grudzinskaya, E. E.; Koroleva, N. S.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27: 63-72 (1970) [7 ref. Ru]

The results are recorded of a chromatographic study of the various changes in the amino acid spectrum of milk induced by the growth of 2 strains of Streptococcus thermophilus and 4 strains of Lactobacillus. Amino acids originally present included considerable amounts of glutamic acid and appreciable amounts of glycine, threonine, alanine, tyrosine, methionine and valine. Growth of the streptococci removed, during their early stages, almost all these amino acids; growth of the bacilli, whether Lactobacillus bulgaricus or acidophilus, left the glutamic acid content almost unchanged, reduced that of threonine and led to an accummulation of histidine, arginine, tyrosine, phenylalanine, leucine, cysteine, methionine and valine and in certain cases lysine. Combinations of streptococci and bacilli intensified both the utilization of the amino acids originally present and the formation of others. GTP

2 P 286
[Culturing of starter strains singly or as selected mixtures.]
Shershneva, V. I.; Lagoda, I.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27: 37-43 (1970) [2 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Starters intended for production of smetana, quarg, granulated quarg, or prostokvasha (a type of soured milk) were compounded from stains of Streptococcus lactis, Str. acetoinicus, Str. cremoris and Str. paracitrovorus, 2 or 3 spp. being represented in any 1 starter, and strains differing between starters according to purpose. Each mixture was tested by methylene blue reduction time for compatibility of components, and those showing antagonism were excluded. Mixed and single-strain starters were cultured for periods of up to 6 months, and starter mixtures identical with the original ones were compounded from component strains after culturing for 1-3 or 5 months. Consistency, taste and aroma evaluations of cultured products prepared with starter mixtures cultured for different periods are tabulated and discussed. It is concluded that culturing of selected mixed starters is preferable to preparation of mixtures from starter strains cultured singly. SKK

P 287
Preservation of BD starters at temperatures of -0°C, -30°C and -196C.]
Waes, G.
Revue de l'Agriculture 23 (8) 1097-109 (1970) [18 ref. Fr, en] [Sta. Laitiere, Melle, Belgium]

3 BD (Betacoccus cremoris + Streptococcus diacatilactis) starter cultures 1 each from Flora Danica, Hansen and Wilken) were added as 1% inocula to 3 batches of sterilized reconstituted dried skim-milk. Portions of the inoculated milk were stored at -20, -30 and -196°C. Over a period of 15 months, samples were removed at intervals and examined for acid production, total counts and counts of aroma bacteria. The results showed that, over the experimental period, each culture was satisfactory with respect to acid production and total counts, irrespective of the storage temp. However, changes were observed in the aroma bacteria counts. During the 7th to 9th month of storage at -20 or -30°C the ratio of leuconostocs to Str. diacetilactis in the Flora Danica starter, and the total aroma bacteria count of the Hansen starter both decreased Storage at -196°C was more satisfactory for both these starters, whereas the Wilken starter was more stable at -20 and -30C. It is concluded that storage of starter cultures at -20 and -30°C should be limited to 4 months. [See also FSTA (1969) 1 1B23.] MEG

2 P 290
[Koumiss from cows' milk.]
Seleznev, V. I.; Artykova, L.
Trudy, Vsesoyuznyi Nauchno-Issledovatel;skii Institut Molochnoi Promyshlennosti 27: 86-91 (1970) [4 ref. Ru]

Cows' skim-milk with added sugar (2.5%) is severely heated (at 90-92°C) with holding for 3-5 min, cooled to the incubation temp. of 26-28C and inoculated with 10% starter consisting of Lactobacillus bulgaricus and L. acidophilus and Saccharomyces lactis. After incubation at 26-28°C to the formation of firm coagulum with 75-85T acidity, the product is stirred and aerated (by circulating through a closed circuit provided with an air valve) with concurrent cooling to 16-18°C. The cooled aerated product should have an acidity of 85-95°T, fluid consistency and should sparkle slightly. After bottling, the koumiss is held for 2 h at 16-20°C to accumulate CO_2 and then ripened at <4°C to avoid an excessive acidity rise. The finished, sparkling product contains 0.1-1.0% alcohol, has an acidity of 100-150°T,

2 P 300
Curd production.
Berridge, N. J. (Naational Research Development Corp.)
United States Patent 3 520 697 (1970) [En]
Milk which may be inoculated with a suitable starter, e.g. Streptococcus thermophilus, and adjusted to pH 6.1-6.3 is renneted at a temp. below that at which curd is formed, after which the renneted milk is brought into contact with a semi-permeable membrane, e.g. of regenerated cellulose or cellulose nitrate, the other surface of which is in contact with water at elevated temp. to heat the milk to a temp. at which curd formation can occur, e.g. 30-50°C. The membrane may be in the form of a tube through which the milk is passed. IFT

2 P 334
[Intensification of production of cultured milks.]
Masimova, A. K.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 27: 32-37 (1970) [21 ref. Ru] [Vses. Nauchno-issled. Inst Molochnoi Promyshlennosti, Moscow, USSR]
Strains of 5 spp. of streptococci were examined for rate of coagulation of sterilized milk at 30°C in the presence of chalk, and for proteolytic power (measured by free amino acid formation during 7-day incubation, expressed as tyrosine). Strains of Streptococcus lactis, Str. acetoinicus and Str. cremoris ranged from weak to strong in proteolytic power, the 1st 2 spp. showing a direct relationship between coagulation rate and proteolytic power. All strains of Str. diacetilactis and Str. paracitrovorus examined showed low proteolytic power. Similar tests with strains of lactobacilli showed high proteolytic power in Lactobacillus acidophilus, L. bulgaricus, L. casei, L. helveticus, and L. plantarum, and in streptobacteria and betabacteria isolated from kefir, but rate of milk coagulation was variable and not related to proteolytic activity. Determination of proteolytic activity by the method outlined is recommended for selection of active cultured milk starters for intensification of production of cultured milks. SKK

2 P 336
[Acidification in reconstituted products containing different TS levels.] Säuerung in rekonstituierten Produkten mit verschieden hoher Milchtrockenmasse.
Voss, E.; Leder, K.-H.
Deutsche Molkerei-Zeitung 91 (39) 1715-18 (1970) [De, en, fr]
The titratable acidity developed in 20 h in reconstituted spray-dried skim-milk by cultures of butter starter, yoghurt and Lactobacillus helveticus rises at a diminishing rate with increase in milk solids, reaching a max. at 25-30% solids and declining thereafter. Acid production ceases at 50% solids. The pH also increases, but irregularly, with increase in solids, apart from a slight initial fall with yoghurt and L. helveticus as TS increases from 0 to 10%; a max. pH of 6.2 is attained at 50% solids. These changes are due to increasing inhibition of lactose breakdown - total at 50% solids - with increasing milk solids, combined with a simultaneous increase in buffer capacity. GTP

2 P 350
Microbial associations in Roquefort cheese. I. Action of enterococci on lactic streptococci and leuconostocs. Nature of stimulating substances produced by Streptococcus faecalis var. liquefaciens.]
Devoyod, J. J.; Desmazeaud, M.
Lait 50 (497) 374-90 (1970) [30 ref. Fr, en] [Sta. Centrale de Recherches Laitieres et de Tech. des Produits Animaux, INRA, Jouy-en-Josas (Yvelines), France]
The effects of milk culture filtrates of Str. faecelis var. liquefaciens on the growth of lactic streptococci and leuconostocs in whey, on acid production by lactic streptococci in milk, and on CO_2 production by leuconostocs in milk, were compared with those of a proteolysate obtained by the direct action of proteolytic enzymes of Str. faecalis var. liquefaciens on whole casein. Culture filtrates showed 5 peaks on gel filtration, the first 3 peaks (mol. wt. 1500-5000, ~1000 and 300-600 respectively) showing stimulatory activity; the activity of the 3rd fraction was similar to that of an acid hydrolysate of casein. Fraction 4 inhibited CO_2 production by leuconostocs. The stimulatory substances were identified as peptides, and were derived mainly from the action of proteolytic enzymes of Str. faecalis var. liquefaciens on casein. [See FSTA (197) **2** 7P856.] CDA

2 P 368
Inhibition of lactic streptococci and some pathogenic bacteria by certain milk-associated volatile compounds as measured by the disk assay.
Kulshrestha, D. C.; Marth, E. H.
Journal of Milk and Food Technology 33 (8) 305-10 (1970) [70 ref. En] [Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

Of 27 milk-associated volatile compounds, Streptococcus cremoris was inhibited by formaldehyde and butyric, decanoic, formic and hexanoic acids, whereas Str. lactis was only inhibited by formaldehyde, glyoxal and decanoic acid. Str. diacetilactis was inhibited by decanoic acid. Leuconostoc citrovorum, Escherichia coli, Salmonella typhimurium and Staphylococcus aureus were all inhibited by decanoic acid, formaldehyde and glyoxal. For all organisms, high concn. (0.1%) of these compounds were required to cause inhibition. Other compounds tested were inhibitory at very high concn. MJL

2 P 392
Survival and activity of frozen starter culture for cheese manufacture.
Keogh, B. P.
Applied Microbiology 19 (6) 928-31 (1970) [13 ref. En] [Division of Dairy Res., CSIRO, Melbourne, Australia]

Cultures (10 ml) of Streptococcus lactis (strains C2, C10 and BA1), Str. cremoris (strains C1, C3, C11, HP, E8 and ML1) and Str. diacetilactis (strains DRC1, DRC2 and DRC3), which had been grown for 6 h at 30°C (25°C for strain HP) in low-Ca co-precipitate whey medium, were neutralized, frozen by discharge in droplet form into mesh bags suspended in liquid N_2, then stored in a liquid N_2 refrigerator. Conc. starter cultures ($\sim 10^{12}$ organisms/ml), in the log. phase of growth and suspended in whey culture medium at pH 6.3 were frozen and stored in the same manner. Viable counts on tryptone/ yeast extract agar were made immediately before and after freezing and at approx. monthly intervals during the storage period (up to 13 months). After rapid thawing, none of the cultures showed a significant change in count or in activity as measured by change in pH during incubation in skim-milk culture for 18 h at 30°C in comparison with co-precipitate whey suspensions of 16-18 h milk cultures (controls). Better activities of some frozen cultures (as shown by the time taken for initial change of pH) was considered to be due to freezing during an active stage of growth compared with the controls, which were in the stationary phase. Cheesemaking using frozen conc. starter (Str. lactis strain C2 only was tested) was normal except that the renneted milk took slightly longer to coagulate due to the higher pH of the starter. BEPC

2 P 399
[Process for the continuous production of ripened rennet cheese.] Verfahren zur kontinuierlichen Herstellung von reifendem Labkäse.
Swiatek, A. (Instytut Przemyslu Mleczarskiego)
West German Patent Application 1 492 795 (1969) [De]

The Ca^{2+} concn. of milk is reduced and rennet is then added at 2-10°C. After the completion of the enzymic reaction, the milk is continuously conveyed to a heater with continuous injection of cultures of lactic acid bacteria. The milk is then heated to 15-25°C, Ca salts are admixed and its temp. raised to 30-40°C as it passes in a laminar flow into a coagulation container. This process ensures uniform coagulating which results in an improved quality of the cheese produced. W&Co

2 P 421
[Method for obtaining a starter culture.]
Sukhotskene, I. I. (Union of Soviet Socialist Republics, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi-syrodel'noi Promyshlennosti)
USSR Patent 223 584 (1968) [Ru]

Starter cultures (consisting of acid- and aroma-producing streptococci) for use in the manufacture of dairy products, e.g. ripened-cream butter, are prepared in a medium consisting of 85% sweet buttermilk and 15% milk. The aroma-producing activity of streptococcal cultures obtained according to this process is claimed to be higher than that of cultures made by a conventional process. FL

2 P 425
[Storing cream.]
Tsaregradskaya, I. V.; Novosadova, L. I. (Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 265 702 (1970) [Ru]

Method provides for pasteurization, cooling and subsequent freezing of cream, e.g. in the form of blocks or slabs. To increase the stability and quality of the cream during storage, a starter culture consisting of lactic streptococci is added to the cream prior to freezing DS3 strains and DS4 cultures of Str. lactis can be used at a rate of 0.2-0.3%. W&Co

2 P 428
[Annual report for 1969 of the Federal Teaching and Research Institute for Hard Cheese in Rotholz.] Jahresbericht 1969 der Bundes-Lehr- und Versuchsanstalt für Hartkäserei in Rotholz.
Winkler, S.
Milchwirtschaftliche Berichte aus den Bundesanstalten Wolfpassing und Rotholz 1970 (24) 169-99 (1970) [De]

In 1969, total milk deliveries to the Institute were ~9.2 million kg, an increase of 3.8% over the preceding yr. Research and testing activities at the Institute included: aeration by the Huwyler system of Emmental cheese during ripening to obviate the necessity of frequent washing and turning over of the cheese; manufacture of cheese using Pfizer microbial rennet; H_2O_2 treatment of cheese brines; determination of N and P and lactose in milk and dairy products; studies of the effects of lysozymes on the activity of different bacteria (propionic acid bacteria, Emmental starter culture, Lactobacillus helveticus, L. lactis, L. casei and Streptococcus thermophilus); and testing of Alpine milk. The manufacture of Emmental cheese (round and in blocks) using the Finnish MKT system is described in some detail. [See FSTA (1969) 1 12P1317 for previous report.] FL

2 P 432
[Producing soft cheese.]
Nikolaev, A. M.; Vinogradova R. P. (Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 266 548 (1970) [Ru]

Dried cream, gelatin, flavourings and spices are added to cream prior to mixing with curd obtained by coagulating skim-milk with a starter consisting of Streptococcus lactis, Str. diacetilactis and Str. paracitrovorus, and the mixture is homogenized. The process increases the nutritional and biological values of the finished product, ensures its soft, plastic consistency and imparts various flavour properties. W&Cc

3 P 449
[Manufacture of a lactic beverage.]
Soloid, M. E.
Molochnaya Promyshlennost' 31 (10) 41-42 (1970) [Ru] [Odesskii Tekhnologicheskii Inst. im. M. V. Lomonosova, USSR]

Skim-milk is severly pasteurized (at 90-95°C for 40 min). 5% sugar added, the milk cooled to 32°C and inoculated with 2% of a combined starter consisting of Lactobacillus bulgaricus + Streptococcus lactis and lactose- and sucrose-fermenting yeast. The milk is bottled (leaving a head space equal to 1/3 of the volume), incubated at 28-30°C for 10-12 h, the bottles are vigorously shaken and transferred to a store at 8-10°C where they remain for 24 h to stop lactic acid fermentation. The beverage, which contains little alcohol, has an acidity of 100-120°T, a thick creamy consistency, milk-white colour and sour-sweet taste. It may be flavoured with strawberry juice or a fruit essence. FL

3 P 452
[Effect of starters on Emmental cheese quality.]
Bijok, F.; Domanska, M.
Roczniki Instytutu Przemyslu Mleczarskiego 11 (6) 89-100 (1970) [20 ref. Pl, en, ru] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

Batches of Emmental-type cheeses were made on the industrial scale from 2100-2800 l. bulks of milk standardized to 2.9-3% fat (fat in cheese DM, ~45%) and distributed into 700 l. vats which were treated in parallel. 7 different starters were tested, each containing pure cultures of different strains of Lactobacillus helveticus and Streptococcus thermophilus with or without L. casei and a butter starter. The starters were added at 0.1-0.2% (in some experiments at 0.2-0.4%) before renneting. 10 drops of a culture of propionic acid bacteria were also added. Renneting was at 33°C, scalding at 54°C for 50-60 min. Cheeses were dry-salted for 1 day and kept in 21% brine for 10 days at 13-15°C. Ripening was for 2-3 wk at 13-15°C, 2-4 wk at 18-22°C and 5-7 wk at 13-15°C, at 84% RH throughout. Results of organoleptic tests and moisture and pH determinations are tabulated in detail. Best results were with 0.1-0.2% of a starter from Hungarian strains of L. helveticus, Strep. thermophilus and L. casei grown singly and mixed in 1:1:1 proportions. Addition of L. casei characteristic aroma and flavour of Emmental cheese. SKK

3 P 468
Relationship between some insecticides and lactic culture organisms in milk.
Sun Chun Kim
Dissertation Abstracts International. Section B. The Sciences and Engineering 30 (11) 4893: Order no. 70-9572 (1970) [En] [St. Univ., East Lansing, Michigan, USA]

Concn. of <0.1-100 ppm dieldrin and heptachlor had no effect on growth and lactic acid production by Streptococcus lactis A254, Str. lactis A62, Str. cremoris E-8 or Str. diacetilactis 18-16 in sterile whole milk when incubated for 48 h at appropriate temp.; similarly, the same concn. of methoxychlor and malathion showed no effect on Str. lactis A254 in milk. The 4 insecticides had no effect on growth or lactic fermentation by Lactobacillus casei in milk at 32°C, with the exception of dieldrin which caused a reduction of viable count in milks containing 10 and 100 ppm dieldrin; no uptake of ^{14}C-dieldrin by L. casei could be demonstrated. These 5 spp. of lactic acid bacteria and Str. diacetilactis DRCI did not modify or degrade aldrin, DDT or lindane during a 2-wk incubation period. CDA

3 P 484
Influence of trace minerals on the acid production by lactic cultures.
Olson, H. C.; Qutub, A. H.
Cultured Dairy Products Journal 5 (2) 12-17 (1970) [16 ref. En] [St. Univ., Stillwater, Oklahoma, USA]

The effects of trace amounts of cartain minerals on acid production by lactic streptococci (Streptococcus lactis and Str. cremoris) was investigated. Preliminary trials showed a beneficial effect of addition of 0.4% sea salt or 0.4 ml seaweed (kelp) extract/10 ml to the pasteurized skim-milk medium. Screening tests with 12 trace elements showed that acid production appeared to be stimulated by addition of ~2 ppm Fe, Mg or Mo or 1 ppm Se, and slightly stimulated by addition of 2-4 ppm Zn or 2 ppm Co to the skim-milk medium prior to incubation at 72°F for ~16 h; up to 8 ppm B, Pb or Li had no effect or were slightly inhibitory while ⩾4 ppm Cu, I or Hg were definitely inhibitory to acid production. Additional trials with Fe, Mg, Mo and Se and 2 pure cultures led to the conclusion that 2 ppm Fe + 4 ppm Mg + 0.5 ppm Se significantly increases ($P < 0.01$) the rate of acid production by lactic streptococci in skim-milk. CDA

[illegible]
US[illegible] Patent 3[illegible]
Method involves p[illegible] homogenizing it, and inoculating [illegible] cultures of lactic acid streptococci. To increase the stability during storage and retailing, only a part of the cream is homogenized, preferably 50-70% by vol. Homogenization can be carried out at 50-70°C and at a pressure of 50-100 kg/cm². W&Co

3 P 502
Pyrrolidonecarboxylyl peptidase activity in Streptococcus cremoris ML1.
Sullivan, J. J.; Jago, G. R.
Australian Journal of Dairy Technology 25 (3) 141 (1970) [4 ref. En] [Russell Grimwade School of Biochem. Univ., Melbourne, Australia]

The formation of pyrrolidonecarboxylic acid (PCA) at the N-terminal of a hydrophobic peptide derived from casein during proteolysis may be responsible for development of bitterness in cultured dairy products. A suggestion that removal of bitterness by non-bitter starters may be due to the presence, in these organisms, of a pyrrolidonecarboxylyl peptidase is supported by the demonstration of this enzyme in cell free extracts of Streptococcus cremoris ML 1, an organism known to produce non-bitter cheese. CDA

3 P 524
[Variations in the microflora of Gorgonzola cheese during ripening.]
Sozzi, T.; Dellaglio, F.
Annali di Microbiologia ed Enzimologia 19 (3/4/5/6) 101-06 (1969) [9 ref. It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

Quantitative changes of lactic acid bacteria occurring in Gorgonzola cheese during manufacture and ripening were followed to evaluate their influence on the quality of the finished product. On the basis of microbial counts and isolation of lactic acid bacteria, it was found that, during cheesemaking, there was a predominance of lactic acid bacteria which grew at 40°C; during dry salting and 'purgatorio' (holding at 24°C and 100% RH for 3-4 days), lactic acid bacteria which grew at 30°C predominated; and during ripening at 4°C moulds developed while all lactic acid bacteria declined. Development of desirable organoleptic properties is chiefly connected with the occurrence of lactic acid bacteria which grow well at 30°C. CEB

3 P 529
Sour milk beverage.
Yamanaka, Y.; Okumura, S.; Hasegawa, Y. (Ajinomoto Co. Inc.)
United States Patent 3 535 117 (1970) [En]

Aquous skim milk compositions containing soybean protein, and certain amino acids are fermented by lactic acid bacteria to yield a sour milk beverage in which the soybean flavour has been suppressed by the presence of the amino acids. IFT

4 P 544
[Total microbial counts of condensed sweetened milk.]
Jarchovska, H.; Brodsky, F.; Hartmanova, J.
Prumysl Potravin 21 (10) 298-99 (1970) [13 ref. Cs] [Statric Vet. Ustav, Hradec Kralove, Czechoslovakia]

Cans of sweetened condensed milk produced in winter were stored at ambient temp. and examined bacteriologically after different periods of storage. For 64 batches of cans, numbers containing the following levels of mesophilic micro-organisms after storage for 1, 2 and 4 wk were, respectively: ⩽100/g, 31, 26 and 18; 101-1000/g, 27, 9 and 12; 1001-10 000, 5, 13, and 8; 10 001-50 000, 0, 10 and 11; >50 000, 1, 6 and 15. Mesophilic counts for 13 individual batches for up to 11 months storage are tabulated. 95% of 76 cans examined immediately after manufacture complied with the Czechoslovakian bacteriological standards; after storage for 14 days and 1 month respectively the % for 74 cans were 90.5 and 78. 140 microbial strains isolated from can contents were classified as follows: staphylococci (Baird-Parker classification) group II, 7; group III, 28; group IV, 14; group V, 45; group VI, 1; group VII, 1; micrococci, 8; enterococci, 7; group N streptococci, 14; aerobic spore-formers, 1; Enterobacter, 6; Achromobacter anitratum, 5; and Alcaligenes faecalis, 3. SKK

4 P 570
[Fermented milk products.]
Tokyo Yakuruto Co. Ltd.
Japanese Patent 27 782/70 (1970) [Ja]

Pasteurized milk is inoculated with a Kloeckera yeast and after incubation is inoculated with a lactic acid bacteria. IFT

4 P 604
[The effect of X-rays on the proteolytic and fermenting capacity of some lactic acid bacteria.]
Dilanyan, Z. Kh.; Arutyunyan, R. K.; Makaryan, K. V.; Akopyan, A. A.
Biologicheskii Zhurnal Armenii 22 (9) 29-33 (1969) [14 ref. Ru, am] [Erevanskii Zooveterinarnyi Inst., Erevan, USSR]

34 strains of homofermentative lactic acid bacteria were subjected to X-irradiation with 36 000 and 54 000 r. 17 of them gave 88 colonies after 36 000 r, and 28 gave 130 colonies after exposure to irradiation of 54 000 r. Only 14 of the 88 roentgen mutants retained a high proteolytic activity; out of the 130 mutants obtained after exposure to 54 000 r, only 16 retained this activity. These 30 mutants showed an increased proteolytic activity ranging from 35 to 81%, and 7 had increased acid-forming activity. The greatest increase in the acid-forming activity was recorded with those strains of L. helveticus and L. bulgaricus which, prior to irradiation, had a max. activity of 172-240°T. Bacteria with a relatively low or average initial proteolytic activity showed the greatest increase in proteolytic activity. The mutants were considered suitable for use in starters for some types of cheeses and lactic acid products. STI

4 P 605
[Methods for improving the keeping quality of yoghurt.] Verfahren zur Haltbarkeitsverlängerung von Joghurt.
Klupsch, H. J.
Molkereizeitung 24 (51/52) 1618-19 (1970) [De]

Measures which may be taken to extend the shelf life of yoghurt, e.g. pasteurization after incubation in combination with aseptic packaging, use of special lactobacilli which reduce the rate of acidification in the finished yoghurt, and gassing with CO_2 are discussed. 2 methods of yoghurt manufacture employing these measures are outlined. FL

4 P 670
[Proceedings of a conference on cheese technology.] Syrotech-70 (Zbornik). [Conference proceedings]
Prekopp, I. (Editor)
380pp. (1970) [Sk & Cs]

[Continued from preceding abstr.] Packaging materials for cheese, by M. Benko (pp. 170-83) [see FSTA (1971) 3 4P676]; Progress in the technology of ewes' milk cheese, by I. Prekopp (184-204); Manufacture of cheese from ewes' milk in Bulgaria, by P. Cernev [Chernev] (192-204 [see FSTA (1971) 3 4P677]; Present situation and prospects in the manufacture and use of rennet, by M. Teply (205-20, 18 ref.); Effect of different forms of Ca and inorganic P on milk rennetability, by S. Gajdusek and F. Sebela (221-28, 13 ref.); Assessment of the suitability of milk for cheese manufacture, by Z. Krcal (229-42); Possibilities of utilizing whey, by M. Dluzewski and E. Pijanowski (243-55, 18 ref.); [see FSTA (1971) 3 4P678]; Some results of studies of milk processing and utilization of by-products, by S. Poznanski (256-304, 54 ref.) [see FSTA (19-1) 3 4P679]; Increasing resistance of Lactobacillus casei to nisin, by B. Hylmar (305-08) [see FSTA (1971) 3 4P680]; and Detection of antibiotics in milk, by J. Jankov and S. Obretenova (309-14) [see FSTA (1971) 3 4P681.]

4 P 672
[Role of starter cultures in the manufacture of different hard cheese varieties.] (In 'Proceedings of a conference on cheese technology'.) Syrotech-70 (Zbornik).
Dilanjan, Z. Ch. (Dilanyan, Z. Kh.)
pp. 26-40 (1970) [10 ref. Sk] Zilina, Czechoslovakia: Zavodna Pobocka CSVTS pri Vyskumnom Pracovisku Mliekarenskeho Priemyslu Ziline [Erevanskii Zoovet. Inst., Erevan, USSR]

In this article, the author reviews the work of his laboratory on the relation of cheese quality to the starter culture, with particular reference to ripening, flavour formation and development of free amino acids in (i) Swiss-type and (ii) Armenian cheeses. 200 strains of lactic acid bacteria were examined. 2 strains of Lactobacillus helveticus, 2 of L. bulgaricus, 1 of L. casei and 7 of L. lactis were used with (i); 3 strains of L. helveticus, 2 of L. casei and 1 of L. lactis were used with (ii). It is concluded that to ensure characteristic organoleptic properties for a given type of cheese, starter selection should be based on the following characteristics: acid formation in cultures after 24 h and 7 days; proteolytic activity; presence of acetoin and diacetyl in the coagulum; syneresis of coagulum; and formation of free amino acids in relation to their proportions in high-quality cheese. SKK

4 P 679
[Some results of studies of milk processing and utilization of by-products.] (In 'Proceedings of a conference on cheese technology'.) Syrotech-70 (Zbornik).
Poznanski, S.
pp 256-304 (1970) [54 ref. Sk] Zilina, Czechoslovakia: Zavodna Pobocka CSVTS pri Vyskumnom Pracovisku Mliekarenskeho Priemyslu v Ziline [Katedra Technologii Mleczarskiej, WSR, Olsztyn, Poland]

This review-type article summarizes work recently carried out in the author's laboratory and deals with the following topics: use of Czechoslovakian ion exchangers for removing radioactive contaminants from milk; breakdown of milk proteins by emulsions of lactic acid bacteria cells and use of the bacterial biomass for enrichment of milk microflora in cheesmaking; biosynthesis of milk-coagulating enzymes and biochemical characteristics of the proteases produced; new types of cheese and study of continuous cheesemaking; preliminary studies of biological value of proteins of some types of cheese and quarg; and study of rational utilization of by-products. SKK

4 P 680
[Increasing resistance of Lactobacillus casei to nisin.] (In 'Proceedings of a conference on cheese technology'.) Syrotech-70 (Zbornik).
Hylmar, B.
pp 305-08 (1970) [Cs] Zilina, Czechoslovakia: Zavodna Pobocka CSVTS pri Vyskumnom Pracovisku Mliekarenskeho Priemyslu v Ziline [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Lactobacillus casei D, which is widely used in Czechoslovakia, was grown in a milk medium enriched with molasses, malt sprouts, yeast extract and ammonium phosphate to which 50 IU nisin were added/ml. Adaptation to this quantity of nisin was obtained after culturing for 6 days in each of 10 passages. Further progressive adaptation to 100, 150 and 200 IU nisin/ml was obtained by culturing at 30°C in whole milk alone, with 10 five-day passages at each nisin concn. The acidifying activity of the adapted strain was less than that of the original strain, but its proteolytic activity was equal to or higher than that of the original strain. The adapted strain could therefore be used in the manufacture of Edam-type cheese, nisin being added to inhibit the growth of butyric acid clostridia. SKK

5 G 179
[Studies on utilization of soya bean protein for food manufacture. II. Influence of soya milk added to skim-milk on the acidity and the hardness of curd produced by lactic acid bacteria for dairy use.]
Yamanaka, Y.; Furukawa, N.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] 17 (10) 456-61 (1970) [12 ref. Ja, en] [Dept. of Zootechnical Sci., Univ. of Agric., Setagaya-ku, Tokyo, Japan]

Cultured milk products from combinations of skim-milk and soya bean milk were studied by inoculating pasteurized samples with lactic starter cultures and measuring the acidity and the degree of curd hardness after 8 h of incubation at 30 or 37°C. The viscosity of 10% dispersions, in the range 63-80°C, increased markedly at 80°C. With 6 cultures of lactic acid bacteria, after 8 h of incubation, the acid production tended to be higher in certain combinations of the 2 milks than in skim-milk alone, except for 1 culture. In soya bean milk, acid production by Streptococcus faecalis, Str. thermophilus and Str. lactis increased a little. At soya bean milk conc. of 20-30% (v/v), the curd after storing for 24 h at 4°C was soft; on the other hand, at concn. of 65-75% (v/v), the curd structure formed was considered too hard. Addition of sucrose to 10% dispersions generally lowered the curd tension, but glucose raised the curd tension when Lactobacillus was used. HE

5 P 703
[Influence of freezing and freeze-drying on the survival rate and percentage of the two lactic acid bacteria (in mixed culture): Streptococcus thermophilus and Lactobacillus helveticus.]
Jabarit, A.
Lait 50 (497) 391-414 (1970) [13 ref. Fr, en]

The effects of different freezing temp. (-20 to -40°C) and different heating temp. during freeze-drying (80 to 120°C in the sublimation stages) on the survival of Str. thermophilus and L. helveticus in mixed culture in 'helvetic' yoghurt were investigated. Changes in the proportions of the 2 organisms were less marked than those reported for mixtures of Str. thermophilus with either L. bulgaricus [FSTA (1969) 1 8P718] or L. acidophilus [FSTA (1970) 2 4P448], a greater proportion of L. helveticus surviving than either of the other 2 Lactobacillus spp. The greater resistance of L. helveticus to freezing and freeze-drying is attributed to physiological properties of the organism and to interaction between it and Str. Thermophilus. Optimum temp. for the 3rd phase of the freeze-drying process was 30-35°C for mixture of Str. thermophilus L. helveticus. CDA

5 P 704
[Influence of freezing and freeze-drying on the survival rate and percentage of the two lactic acid bacteria (in mixed culture): Streptococcus lactis and Lactobacillus helveticus.]
Jabarit, A.
Lait 50 (498) 544-68 (1970) [5 ref. Fr, en]

When mixtures of Str. lactis and L. helveticus were frozen and freeze-dried under the same range of temp. conditions as in the preceding abstr., survival of Str. lactis was greater than that of L. helveticus. The difference in % survival between the 2 organisms ranged from 2.8 to 4.4%, and was greatest when the freezing temp. was -25 or -40°C. The effect of freezing temp. appeared to be of less importance with these 2 organisms than with the pairs of organisms studied previously. 10-12% of the total bacteria survived freezing and freeze-drying. It is suggested that growth of Str. lactis and L. helveticus is probably not symbiotic or that there is no reciprocal stimulation between the 2 organisms. As in the previous abstr., the optimum temp. for the 3rd phase of freeze-drying was 30-35°C. [See also FSTA (1970) 2 4P448 & (1969) 1 8P718.] CDA

5 P 711
Microbiology and chemistry of 105-year-old cheese.
Minor, T. E.; Marth, E. H.; Olson, N. F.; Richardson, T.; Hantke, W. E.; Bradley, R. L., Jr.; Calbert, H. E.
Journal of Dairy Science 53 (12) 1795-801 (1970) [18 ref. En] [Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

Approx. 14.9 kg cheese, which had lain for 105 yr in an earthen pot on the bottom of Green Bay, Lake Michigan, was examined. The interior of the cheese contained only a Lactobacillus sp., resembling L. casei, at ~30 000/g, whereas the surface of the cheese contained ~50 000 Bacillus sp. 40 Escherichia coli 40 Aerobacter aerogenes/g; silt which covered the cheese contained large numbers of Bacillus sp., Clostridium sp., E. coli, A. aerogenes, yeasts and moulds. Salmonellae and staphylococci were not detected in the cheese. The chemical composition of the cheese was 56.6% moisture, 32.32% fat, 0.19% NaCl, 0.34% protein and 11.08% SNF (including protein and NaCl); levels of free fatty acids (235-240 mg/g) exceeded those reported for Piccante-type Provolone or Blue cheese. Organochlorine compounds were not recovered, suggesting that the cheese, in recent years, was not in direct contact with circulating Lake Michigan water. CDA

5 P 719
Methylene blue keeping quality test and flora of market cream.
Cox, W. A.
Journal of the Society of Dairy Technology 23 (4) 195-202 (1970) [14 ref. En] [Unigate Central Lab., London, UK]

With the methylene blue keeping quality (MBKQ) test applied to cream, anomalous results were sometimes obtained with samples of freshly processed cream of low plate count, and from which coliforms were absent; these results were shown to be due, in some instances, to the types of bacteria present. Of 85 market cream samples, the number in which the following organisms predominated on receipt and after incubation (17 h at 20°C) and the average MBKQ (h) on receipt and after incubation respectively were as follows: Corynebacterium spp., 43 and 8, 4 and 6½; Micrococcus spp., 7 and 2, 5½ and ; coagulase-negative staphylococci, 3 and 3, 0 and 0; Streptococcus spp., 6 and 10, 0 and 1; Bacillus cereus, 0 and 30, not tested and 3¼; other Bacillus spp., 0 and 1, not tested and ½; oxidase-negative, Gram-negative bacteria (mainly Acinetobacter spp.), 12 and 12, 0-1¼ and 0-1½; oxidase-positive, Gram-negative bacteria (Pseudomonas, Aeromonas, Flavobacterium, Alcaligenes), 13 and 19, 0-3 and ¼-3½. CDA

5 P 747
Complexity and specificity of euglobulin in relation to inhibition of bacteria and to cream rising.
Stadhouders, J.; Hup, G.
Netherlands Milk and Dairy Journal 24 (2) 79-95 (1970) [24 ref. En, nl] [Inst. for Dairy Res. (NIZO), Ede, The Netherlands]

The euglobulin prepared from colostral whey contained not only agglutinins against some starter streptococci and globules but also antibodies which attached the organisms to the fat globules. The latter 2 antibodies were found to be cryoglobulins, as they aggregated from the euglobulins in the cold. The binding antibodies are as specific as the bacterial agglutinins. BR

5 P 753
Bacteriophage active against the lactic acid beverage-producing bacterium Lactobacillus casei.
Watanabe, K.; Takesue, S.; Jin-Nai, K.; Yoshikawa, T.
Applied Microbiology 20 (3) 409-15 (1970) [21 ref. En] [Fac. of Pharmaceutical Sci., Univ., Fukuoka, Japan]

At a factory manufacturing Yakult, a lactic acid beverage, previous phage attack by bacteriophage J1 had resulted in the selection of L. casei Shirota (S) strain which was resistant to this phage. However, subsequent decreased acid production during fermentation led to the isolation of another phage, PL-1, which was specific to L. casei S, and exhibited serological cross-reaction with J1 phage. The biological properties of phage PL-1 have been determined in an attempt to find measures of suppressing phage development at the factory. Since PL-1 and J1 phages required more Ca^{2+} than the concn. needed for growth of the host bacteria, the elimination of Ca^{2+} with specific chelators (which must be harmless to the human body) is suggested as a possible means of phage control. CDA

5 P 754
Diacetyl reductase of Lactobacillus casei.
Branen, A. L.; Keenan, T. W.
Canadian Journal of Microbiology 16 (10) 947-51 (1970) [17 ref. En] [Food Sci. Inst., Purdue Univ., Lafayette, Indiana, USA]

5 P 755
[Determination of the acid-producing activity of concentrated frozen suspensions of lactic acid bacteria.]
Accolas, J. P.; Auclair, J.
Lait 50 (499/500) 609-26 (1970) [18 ref. Fr, en] [Sta. Centrale de Recherches Laitieres et de Tech. des Produits Animaux, INRA, 78-Jouy-en-Josas, France]

A method has been developed for the graphical determination of the acid producing activity of a given suspension of lactic acid bacteria. It is based on the linear relationship between the amount of lactic acid produced by a milk suspension of the organism and the log of the number of bacteria in the inoculum, and assumes that suspension A is x times more active than suspension A_2 of the same strain if A_1 can be diluted x times more than A_2 to give the same acid production. The same reference curve could be used for all strains of mesophilic streptococci, but thermophilic lactobacilli and possibly also Streptococcus thermophilus require a separate reference curve for individual strains. The difference in acid production between 2 consecutive 2-fold dilutions of the same strain ranged from 2.5°D for Str. thermophilus 302 to 26°D for L. helveticus 303. CDA

5 P 756
[Lactic acid fermentation at low temperatures.]
Ikonomov, L.; Stefanova-Kondratenko, M.
Veterinarnomeditsinski Nauki 7 (9) 45-54 (1970) [14 ref. Bg, ru, en] [Tsentralna Lab. po Mlechna Promishlenost, Sofia, Bulgaria]

Single cultures of 4 strains of Streptococcus lactis, 6 of Str. thermophilus, 2 of Lactobacillus casei, 4 mixed cultures of L. bulgaricus + Str. thermophilus, and 2 mixed cultures of Str. lactis L. casei were inoculated at 0.3% into sterile skim-milk. Incubation was at 4, 7, 10, or 15°C for 60 days, or the following temp. scheme (similar in the 1st 24-26 h to that customary in the manufacture of White pickled cheese) was used: an initial temp. of 30°C was maintained for 1.5 h, then temp. was gradually lowered to 25-26°C in 5-7 h, to 15-17°C in 15-19 h and finally to 4, 7, 10 or 15°C in 1-2 h; these final temp. were then maintained for the remainder of the 60-day period. Bacterial counts and measurements of titratable acidity, pH and, in some cases, soluble proteins and free amino acids are reported for the 2nd, 5th, 10th, 15th, 30th and 60th days of incubation. Some of the Str. lactis strains grew slowly at 4 and 7°C, and all grew well at 10°C; none of the L. casei strains grew at 4-10°C, but all grew slowly at 15°C; the growth of Str. lactis + L. casei mixed cultures was determined by the growth characteristics of the Str. lactis strain; Str. thermophilus strains and the L. bulgaricus + Str. thermophilus mixed cultures did not grow at 4-10°C but some of them grew at 15°C. All the strains of lactic acid bacteria incubated under the White pickled cheese temp. scheme grew well, reaching, in the 1st 5 days, counts of 1000-3000 million/ml (initial count, 1-3 million/ml) and titratable acidity of culture of >75°T. Only Str. lactis showed proteolytic activity at 7-10°C. SKK

5 P 764
[Bacterial starter for White pickled cheese.]
Yankov, Ya.; Marinova, E.; Denkov, Ts.; Mirchev, M.
Izvestiya na Nauchnoizlidovatelski Institut po Mlechna Promyshlenost
3: 131-46 (1969) [39 ref. Bg, ru, en]
[Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

1400 strains of lactic streptococci were isolated from 152 samples of bulk cows' and ewes' milk, cream, home-made cheese (without starter), meadow grass and silage. 67 strains of Str. lactis were chosen for detailed examination on the basis of efficiency of milk coagulation. 52 of these strains were resistant to 43 strains of bacteriophage. The resistant strains were tested alone or in combination with Lactobacillus lactis for suitability for manufacture of White pickled cheese, and were compared with commercial and type collection starters. Results of bacteriological, organoleptic and chemical examination of the cheeses produced and their contents of free amino acids are tabulated. Selected mixed or single-strain starters were tested under practical conditions in 3 dairy factories in 1965-1968. It is concluded that best protection against bacteriophage attack was obtained by using phage-resistant starters consisting of single strains of Str. lactis with L. lactis, and changing them periodically. SKK

5 P 817
Preservation of starter cultures in liquid nitrogen.
Reif, G. D.
Dissertation Abstracts International. Section B. The Sciences and Engineering 30 (11) 4893-94: Order no. 70-7730 (1970) [En] [St. Univ., Ames, Iowa, USA]

Investigations were carried out on 39 single-strain and 14 mixed-strain cultures of lactic streptococci. Activity was determined as the acidity developed after incubation for 6 h at 32°C. When cultured at 15 and 21°C respectively, max. counts were reached after ~20 and ~14 h and max. activity after 24-28 and ~20 h; culturing at 21°C showed no advantages over culturing at 15°C. Culture viability and activity were well-maintained after 6 months of storage at -196°C, when cultures were between 12 and 36 h of age at harvesting; death and injury were less in cultures stored at -196 than at -20°C. Max. activity/cell generally occurred after 1 month of storage, whereas proteolytic activity was max. at the time of freezing and decreased with storage. Growth response after storage was equally good for slow- and fast-acid-producing cultures. Cheddar cheese was successfully made using a direct inoculum of frozen concentrated culture, cells of which varied in age from 12 to 24 h at harvesting. CDA

6 P 833
New Zealand Society of Dairy Science and Technology, Dairy Science Section, Conference 1970.
Wood, J. M. (New Zealand, Society of Dairy Sc and Technology) (Chairman)
New Zealand Journal of Dairy Science and Technology 5 (4) 162-67 (1970) [En] [Lactose Co. of New Zealand Ltd., Kapuni, New Zealan

The following papers were presented at the conference: The role of the Dairy Science Section, by J. M. Wood (pp. 162-64, Chairman's address); Some aspects of spray drier design, by D. J. Woodhams (p. 165); The monocarbonyl content of dairy products, by N. Walker (p. 165); a series of papers on the seasonal variations in composition of milk, comprising Proteins, by W. B. Sanderson (p. 165 Ionic components, by K. N. Pearce & D. F. New (pp. 165-66), and Other components, by L. K. Creamer & A. K. R. McDowell p. 166); a series o papers on Proteolysis - the key to starter activity, comprising Instability of the proteinas character of lactic streptococci, by L. E. Pearce (p. 166); Proteolytic activity and bitterness in Cheddar cheese, by R. C. Lawrence, F. G. Martley & J. Gilles (p. 166) and Proteolytic degradation of caseins in Cheddar cheese, by B. Richardson & L. K. Creamer (pp. 166-167); The purifications and properties of yeast β-galactosidase, by T. A. Nickerson (p. 167); and Raw milk quality assessment - report on Summe School, by R. M. Fenwick (p. 167). CDA

6 P 851
Method for the cultivation of lactobacteria.
Rehm, E.
British Patent 1 208 599 (1970) [En]

Lactobacilli, in particular L. bifidus and/or L. acidophilus are cultured successively on nutrient media containing live, killed or inactivated pathogenic bacteria, e.g. typhoid, enteritis and/or dysentery organisms, the medium, at least in the last culturing stage, containing only killed or inactivated pathogenic bacteria. The final culturing is on a pathogen-free medium, preferably derived form milk and/or liver. The bacteria may be preserved by drying, freezing or freeze-drying, and may be added to foodstuffs, preferably dairy products, e.g. condensed milk, dried milk, yoghurt, cream, cheese or butter. The bacterial preparations are for use as therapeutic agents against bacterial infections of the intestinal tract. FL

6 P 889
Lipolytic and proteolytic activity of enterococci and lactic group streptococci isolated from young Cheddar cheese.
Dovat, A. M.; Reinbold, G. W.; Hammond, E. G.; Vedamuthu, E. R.
Journal of Milk and Food Technology 33 (9) 365-72 (1970) [23 ref. En] [Dept. of Food Tech., St. Univ., Ames, Iowa 50010, USA]

Lipolytic and proteolytic screening techniques were applied to 21 of 107 isolates (16 enterococci and 5 lactic streptococci) from 41 young Cheddar cheeses from 10 Iowa cheese plants. Cultures were grown in skim-milk, cream and in skim-milk containing 4% tributyrin, and were tested for lipolytic activity, after 4, 16 and 32 days at 21°C by a screening technique on Nile blue sulphate agar and determination of volatile fatty acids by GLC; proteolysis indices, plate counts and changes in pH were also determined after incubation at 7, 15, 21 and 32°C in skim-milk. The 5 strains of lactic streptococci consistently produced the lowest levels of acetic acid (≤60 mg/100 g culture), whereas 4 strains of Streptococcus durans frequently produced >250 mg acetic acid/100 g. Compared with the enterococci other than Str. faecalis va. liquefaciens, the lactic streptococci were more proteolytic, produced lower pH values and gave lower plate counts after 32 days at 15, 21or 32°C.
All of the 21 cultures were able to hydrolyse tributyrin, enterococci being the most active. Tests on combination of the enterococci and lactic streptococci produced anomalous results. CDA

6 P 912
[Scheme for bacteriological analysis of flavoured jellified and renneted milks.]
Fontaine, F.; Luquet, F. M.
Revue Latiere Francaise 1970 (280) 742-43 (1970) [Fr] [Lab. d'Ind. Laitiere, 59 Douai, France]

The scheme includes testing for coliforms, Escherichia coli, yeasts + moulds, leuconostocs, faecal streptococci and Bacillus spp. The standard recommended (not an official standard) is the absence of coliforms in 0.1 g, <100 yeasts + moulds/g, absence of leuconostocs in 1 g, and absence of pathogenic organisms. Media utilized in the analysis, and characteristics used to differentiate leuconostocs from Klebsiella spp. and from Streptococcus salivarius are listed. CDA

6 P 925
Studies on the proteolytic action of dairy lactic acid bacterial. XI. The ripening of aseptic rennet curd by Streptococcus cremoris and Lactobacillus helveticus.
Ohmiya, K.; Sato, Y.
Agricultural and Biological Chemistry 34 (10) 1463-69 (1970) [16 ref. En] [Fac. of Agric., Univ., Nagoya, Japan]

Rennet curd prepared under aseptic conditions and S. cremoris and L. helveticus cheese prepared by sandwiching cell pellets between aseptic rennet curd were ripened at 10°C. The water-soluble N content of rennet curd increased gradually throughout the ripening period to 16, 23 and 28% of the total N after 0, 12 and 60 days; with S. cremoris cheese it reached 27 and 44% after 12 and 60 days and with L. helveticus cheese 24 and 50% after 12 and 70 days. These results are taken as evidence that rennet in aseptic curd was active throughout ripening. α_{s}-Casein was more easily degraded by lactic acid bacteria than by rennet, chiefly by intracellular proteases released by autolysis of bacteria after 12 days of ripening. Ripening was shown by increase in cell-free DNA from 6 to 21% and decrease in viable cell count from 7×10^{9} to 2×10^{7} after 6 wk. Changes in protein pattern were followed by agar-gel electrophoresis and scanning electron micrography of fractures and surfaces of the various specimens. [See FSTA (1970) 2 10P1283 for part X.] RM

6 P 947
The fate of organochlorine pesticides in processed dairy foods.
Li, C.-F.
Dissertation Abstracts International. Section B. The Sciences and Engineering 30 (12) 5548: Order no. 69-22 423 (1970) [En] [Univ., Madison 6. Wisconsin, USA]

See FSTA (1970) 2 6P806.

6 P 948

The influence of heat treatments on the rates of acid production by lactic cultures.

O'son, H. C.; Gilliland, S. E.

Cultured Dairy Products Journal 5 (3) 2-7 (1970) [16 ref. En] [Dept. of Animal Sci. and Ind., St. Univ., Stillwater, Oklahoma, USA]

Acid production by mixed lactic cultures Leuconostoc spp. + Streptococcus lactis (or Str. cremoris) in heat-treated skim-milks was highest in milk which had been heated at 160°F for 30 min (titration value after 4 h at 90°F, 6.89 ml N/10 NaOH) followed by that in skim-milk heated at 250°F for 15 min (6.5 ml) and 143°, 180° or 210°F for 30 min (6.40, 6.18 and 6.03 ml respectively); 160°F resulted in significantly higher values ($P<0.01$) than 180 or 210°F. In reconstituted dried skim-milk, the order was reversed, mean titration values being as follows: 210°F for 30 min, 7.06; 180°F for 30 min, 6.91; 250°F for 15 min, 6.86; 160°F for 30 min, 6.22; treatment at 180 or 210°F resulted in significantly higher values ($P<0.01$) than treatment at 160°F. In mixtures of 2 parts skim-milk:1 part whole milk (as often used for making cultured buttermilk) mean titration values were as follows: 250°F for 15 min, 7.57; 200°F for 30 min, 6.55; 160°F for 30 min, 5.88; 180°F for 30 min, 5.35; all values were significantly different from each other ($P<0.01$). Activity of individual cultures varied considerably with heat treatment of the milk, and of 37 commercial cultures, 13 were classified as high temp.', 18 as 'low temp.' and 6 as 'indifferent'; corresponding classification of 29 pure cultures of lactic streptococci isolated from commercial lactic cultures was 3, 13 and 13. CDA

6 P 967

Identification of a stimulant for Lactobacillus casei produced by Streptococcus lactis.

Branen, A. L.; Keenan, T. W.

Applied Microbiology 20 (5) 757-60 (1970) [15 re En] [Food Sci. Inst., Purdue Univ., Lafayette, Indiana 47907, USA]

A compound, stimulatory to the growth of L. casei, was isolated from cell extracts of Str. lactis, purified, and identified as a small peptide with a mol. wt. of ~4500. The purified peptide did not contain nucleic acids, P, glucosamine or carbohydrates. Of the 16 amino acids detected in acid hydrolysates of the peptide, serine, proline, glycine, alanine, leucine and glutamic acid were present in the greatest amounts. Stimulation in milk culture implicated the peptide as a possible factor in development of lactobacilli in Cheddar cheese during ripening. AS

6 P 992

Growth and activity of Streptococcus cremoris in skim-milk fortified with some volatile compound

Kulshrestha, D. C.; Marth, E. H.

Journal of Milk and Food Technology 33 (11) 492 (1970) [3 ref. En] [Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

Skim-milks were fortified with 1, 10, 100, 1000, 10 000, and 100 000 ppm of the following milk-associated volatile compounds: acetaldehyde, isobutyraldehyde, propionaldehyde, acetone, 2-butanone, 2-pentanone, ethanethiol, 1-propanethiol, 2-propanethiol, chloroform, ether, acetonitrile, ethylene dichloride, and methylsulphide. They were then inoculated with Str. cremoris, incubated at 22°C, and tested after 2, 5, 8, 11, and 16 h of incubation for total numbers and titratable acidity. The aldehydes, at concn. of 10-100 ppm and higher, markedly reduced both growth and acid producti with the effects most pronounced at and beyond 11 h of incubation. Ketones tested were less inhibitory than the aldehydes and, at the higher concn., caused a more pronounced reduction in acid development than in growth. Th thiols, especially at concn. of 100 and 1000 ppm, markedly reduced growth but this was not reflected in a similar reduction of acid production. Chloroform and ether were more detrimental to acid formation than to growth, whereas ethylene dichloride caused marked inhibition when measured by either parameter. A slight reduction in growth but stimulation of acid production were caused by 10, 100, and 1000 ppm acetonitrile and methylsulphide. [See also FSTA (1971) 3 2P368.] AS

6 P 1013
Estimation of the oxidation-reduction potential as an aid in tracing the cause of excessive openness in cheese.
Langeveld, L. P. M.; Galesloot, T. E.
Netherlands Milk and Dairy Journal 25 (1) 15-23 (1971) [18 ref. En, nl] [Inst. for Dairy Res. (NIZO), Ede, The Netherlands]

The reasons are discussed for failure of bacteriological and/or chemical tests to show whether or not a gas defect is caused by hydrogen-producing bacteria. Oxidation-reduction potential (ORP) measurements in cheese showed the possibilities of using this method as an aid to finding the organism causing excessive openness in Dutch cheese. When excessive gas production was due to H_2-producing bacteria (coliforms, Clostridium tyrobutyricum or Lactobacillus bifermentans) the ORP was lowered from approx. -130mV (in cheese fermented with normal lactic starter) to approx. -270mV; this low value persisted for several months. Although the method did not show which H_2-producing organism was present, a lowered ORP in a young cheese could only be caused by coliforms, whereas in cheese made from pasteurized milk to which nitrate had been added, a lowered ORP usually indicated Cl. tyrobutyricum or L. bifermentans. CDA

7 P 1043
[Proteolytic activity of lactic streptococci and lactobacilli.]
Maksimova, A. K.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 26: 52-69 (1968) [21 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

The proteolytic activity of various streptococci was studied as a step towards accelerating the production of cultured milk products 11 of 21 cultures of Streptococcus lactis tested had high proteolytic activity (coagulation time for milk inoculated with 5% culture, 4-5.5 h; tyrosine released after 7 days, 369-430 μg/ml whey). Corresponding figures for 2 other species with high proteolytic activity were: Str. acetoinicus, 9 of 15 cultures, 6.7-7 h, 302-348 μg; Str. cremoris, 16 of 37 cultures, 5-6 h, 372-498 μg. All 8 Str. diacetilactis and all 9 Str. paracitrovorus cultures had low proteolytic activity. A direct relationship was observed between rate of acid production and intensity of proteolytic activity in cultures of Str. lactis and Str. acetoinicus, but not in those of Str. cremoris. Tests on 24-h cultures (3%) of Str. lactis (strains 241, 202) and Lactobacillus helveticus (strain 188), inoculated into sterilized (10 min at 120°C) milk with added chalk, showed the amount of tyrosine released to be a satisfactory criterion for selection of strains with high proteolytic activity. HBr

7 P 1046
Modern trends in yoghourt manufacture.
Ginslov, B. O.
South African Journal of Dairy Technology 2 (1) 79-83 (1970) [1 ref. En, af] [Clover Dairies (Pty.) Ltd., Durban, R. of S. Africa]

A description is given of the testing of milk for yoghurt, yoghurt starter preparation (a 2-stage method involving addition of 1% Streptococcus thermophilus culture and incubation to 0.22% acidity, and addition of 1% Lactobacillus bulgaricus with further incubation), and of a method for the manufacture of 'pourable' stirred yoghurt. The method includes pasteurizing milk with 2.5% butterfat and 9.5% SNF at 94.5°C with holding for $\geqslant$2 min, homogenizing at 205 kg/cm^2, cooling to 31.7°C, and incubation with 1% starter for ~14 h to an acidity of 1%. The product is then pumped through a special plate cooler with cooling to 20°C, bottled, and cooled further in cold room to <7°C. In storage tests at <7°C or at 26.6°C, the product kept well for ↑1 days, retaining its clean taste; the acidity increased from 0.95 to 1.22% and from 1.1% to 1.87% for the 2 temp. respectively. FL

7 P 1133
Production of bitter flavour components by lactic cultures.
Harwalkar, V. R.; Seitz, E. W.
Journal of Dairy Science 54 (1) 12-14 (1971) [11 ref. En]

A bitter strain and a non-bitter strain of Streptococcus cremoris were grown in skim-milk and in various media with and without casein. The cultures were freeze-dried, then extracted with chloroform/methanol (see preceding abstr.). Both strains produced bitter flavour components in skim-milk ,but the bitter strain produced considerably more than the non-bitter strain. Bitter flavour components were extracted from the whey and curd portions of the culture. However, incubation of curd only as compared to incubation of the entire skim-milk culture, produced more bitterness. Typical bitter flavour was not produced when cultures were grown in defined media containing amino acids as a source of N or in Elliker's medium. Cells grown in Elliker's medium containing casein, produced typical bitterness. Thus proteolysis of casein, rather than de novo synthesis by the bacteria, is the source of bitter flavour components. AS

7 P 1119
[Obtaining a starter for manufacturing hard cheese.]
Dilanyan, Z. Kh.; Ter-Kazar'yan, S. Sh.; Ioanisyan, T. A. (Union of Soviet Socialist Republics, Erevanskii Zootekhnicheskо-Veterinarnyi Institut)
USSR Patent 277 535 (1970) [Ru]

Lactobacilli and lactic streptococci are selected according to acid and aroma formation, proteolysis, thermal stability, salt tolerance, etc. To obtain a starter for each individual type of cheese and improve its quality, free amino acids are determined during cultivation of the bacteria in milk and compared with the free amino acids composition of the type of cheese being produced. Those strains are selected whose quantitative ratio of accumulated amino acids corresponds to that in the cheese. W&Co

7 P 1121
[Goats' milk cheese and production process.]
Laiterie Cooperative de la Mothe Saint-Heray.
French Patent 1 593 945 (1970) [Fr]

After pasteurization, the milk is inoculated with a starter, e.g. Streptococcus or Betacoccus, obtained from the microflora of goats' milk, and rennet is added. The curd obtained is optionally washed with water, subjected to intense mechanical mixing, and pre-pressed under whey. The cheese is then moulded, e.g. into a cylindrical, parallelepipedic or hexagonal shape. Final pressing is followed by salting in brine. W&Co

7 P 1167
[Study of koumiss microflora.]
Grudzinskaya, E. E.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 26: 82-88 (1968) [10 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

124 strains of lactobacilli, acetic acid bacteria and yeasts were isolated from liquid and dried koumiss samples. The lactobacilli comprised Lactobacillus casei and L. bulgaricus strains; the yeasts belonged to the Saccharomyces, Pichia and Rhodotorula genera; 6 of the acetic acid bacteria strains were found to synthesize vitamin B_2. It is considered that lactobacilli are mainly responsible for acidity formation in koumiss, and that they create conditions favourable to yeast development and form symbiotic relationships with acetic acid bacteria, the latter using lactic acid as energy source. Alcoholic fermentation is the main process in koumiss production, lactic aid fermentation being secondary (milk acidity increases only 2-fold during fermentation). SKK

7 P 1221
Induction of mutation in Streptococcus diacetilactis by nitrosoguanidine and ultraviolet irradiation.
Kuila, R. K.; Ranganathan, B.; Dutta, S. M.; Laxminarayana, H.
Journal of Dairy Science 54 (3) 331-34 (1971) [17 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

9-h cultures of Str. diacetilactis DRC_3 were exposed to mutagenic action of 10-500 μg N-methyl-N'-nitro-N-nitrosoguanidine (NTG)/ml ± UV irradiation of up to 9000 ergs/mm^2. Total acidity and production of acetoin varied considerably irrespective of the mutagenic treatment, indicating possible changes in exposed cells. Average titratable acidity was lower in mutants than in the untreated culture (0.3-0.42 vs. 0.45); survivors of exposure to 500 μg NTG/ml ± UV-irradiation had an average titratable acidity of 0.3%. The mutants generally had decreased acetoin and diacetyl production, and some had lost the ability to produce 1 or both of cheese compounds; but 8 mutants isolated after the combined treatment had increased diacetyl production. 1 mutant, which did not coagulate milk within 48 h (vs. $<$18 h for the parent culture) was studied in detail; it produced nearly twice as much acetaldehyde as the parent culture but did not differ significantly from in volatile acidity, dacetyl, acetoin or proteolytic activity; it did not show any further physiological variations even after prolonged maintenance and repeated subculture over 6 months. CDA

7 P 1222
[Changes in characteristics of lactic acid bacteria under the influence of radiant energy and other factors.]
Bannikova, L. A.; Maksimova, A. K.; Grudzinskaya, E. E.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 26: 3-11 (1968) [4 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]
Effects of irradiation with UV light or fast neutrons on proteolytic activity and acid production by lactic acid bacteria were studied with Lactobacillus helveticus 305_5 and L. casei 304_4 chosen for their proteolytic activity. Effects of UV irradiation and of treatment with sarcolysine and sodium sulphite on diacetyl and acid production were studied with strains of Streptococcus diacetilactic, Str. acetoinicus, Str. lactic and Str. paracitrovorus. Results are tabulated and discussed. Mutants in which the properties stated were enchanced or diminished were formed from lactobacilli and streptococci by both types of irradiation. On culturing in skim-milk, UV-enchanced lactobcailli mutants did not maintain their activity, whereas some of the neutron-enchanced mutants remained stable. UV irradiation, and particularly sarcolysine treatment, of streptococci gave some mutants with enchanced ability to produce diacetyl, but in none of them was the property stable. Sodium sulphite treatment of streptococci produced some stable mutants with enchanced ability to produce volatile acids and acetoin, but none of them synthesized diacetyl. Culturing of streptococci in diluted milk occasionaly increased diacetyl formation. SKK

7 P 1223
[Increasing the proteolytic activity of lactic acid bacteria.]
Pyatnitsyna, I. N.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 26: 37-52 (1968) [4 re. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]
Numerous Streptococcus lactis strains were cultured, and those with the higher proteolytic activities were selected for further treatment. Exposure of such strains to UV irradiation produced variants with enchanced activity which, however, did not prove stable on subculturing. Better results were obtained by adding a dilute solution of ethylenimine to Str. lactis cultures and irradiating them after 1.5 h storage at 5%C. Enhanced activity variants so obtained, particularly those in the highest activity range, retained activity in further culturing, Long-term culturing of 8 Str. lactis and 6 Lactobacillus lactis strains in milk medium with chalk resulted in production of 3 L. lactis strains with enchanced proteolytic activity. SKK

7 P 1224
[Fermentation starters.]
Meiji Milk Products Co.
Japanese Patent 35 221/70 (1970) [Ja]
Process is described in which Lactobacillus bulgaricus and Streptococcus thermophilus strains are separately cultured in a milk medium to produce a base starter, which is then cultured in a further medium to produce bulk starter. IFT

7 P 1231
[Preparation of starter with cultures of lactobacilli and aroma-producing streptococci.]
Chuzhova, Z. P.
Molochnaya Promyshlennost' 32 (1) 10-13 (1971) [Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich USSR]
Use of a mixed culture of Lactobacillus helveticus 304 and Streptococcus diacetilactis 'yabl.' strain is recommended for continuous line production of ripened cream butter with a pronounced cultured milk taste and pleasant aroma. For preparation of primary starter culture, sterilized or boiled milk is inoculated at 34-35°C with 1 g of the dried culture/2 l. and is incubated for 24 h; titratable acidity should then be 70-110°T and the culture should contain diacetyl and acetoin and show lactobacilli and streptococci under the microscope. Industrial starters are prepared from the primary starter by subculturing 1 × or 2 × as follows: 2-5% of the starters are added to heat treated milk (95°C for 45 min) and incubated for 16-17 h at 30°C (in autumn, temp. may be reduced to 28°C). Characteristics of industrial starters should be similar to those of the primary starter, but titratable acidity should be 110-130°T(up to ⩽+10°T is acceptable). [See also FSTA (1969) 1 6B260.] SKK

7 P 1239
Accelerated ripening of Swiss cheese curd.
Singh, V. K.; Kristoffersen, T.
Journal of Dairy Science 54 (3) 349-54 (1971) [13 ref. En] [Dept. of Dairy Tech., Agric, Res. and Development Center, Columbus, Ohio 43210, USA]
Studies were conducted on the applicability of the curd slurry process [See FSTA (1970) 2 8P1126 & J. Dairy Sci. 50 (3) 292] for ripening Swiss cheese curd from pasteurized milk and for selected controlling factors and chemical ripening changes. Swiss curd slurries containing ~40% TS, 18.5% fat, .16% salt and 1.1% added propionic acid culture developed full, characteristic Swiss cheese flavour after 5-6 days storage at 30%C. Development of characteristic flavour in slurries was accompanied by increased pH, decreased lactic acid, and formation of active SH groups. Head-space volatiles produced were quantitatively similar to those of aged Swiss cheese. Rate of development of characteristic flavour in slurries was enhanced by 100 ppm reduced glutathione, was related directly to initial pH and amount of propionic acid culture, and inversely related to salt concn. Flavour of the slurries was affected adversely when methionine or 10 ppm Cu but not 1 ppm Cu were added and when curd used for slurry was manufactured with only Streptococcus thermophilus. AS

7 P 1244
[Effect of thermoduric lactic acid bacteria on development of acidifying microflora of small rennet cheeses.]
Sukhotskene, I.
Trudy Litovskogo Filiala Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyslennosti
5: 323-32 (1970) [16 ref. Ru, en] [Litovskii Filial Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Kaunas, USSR]
Counts of thermoduric bacteria (TB) (mainly Streptococcus thermophilus and Str. bovis) in pasteurized (short time at 70-71°C) cheese milk in Lithuanian dairy factories ranged from 85 000 to 248 000/ml in winter and from 1 270 000 to 2 595 000/ml in summer. In comparison with ~8 million starter organisms/ml, TB thus contributed a significant proportion of the cheese vat flora. To study their effects on starter bacteria, Str. paracitrovorus Str. diacetilactis, Str. cremoris, Str. lactis and mixed starters were cultured in sterile milk in the presence of thermoduric streptococci and/or lactic acid bacilli. TB stimulated development and activity of Str. paracitrovorus but often inhibited development and aroma production of Str. diacetilactis; starter cultures of Str. cremoris and Str. paracitrovorus stimulated development of lactic and bacilli; and symbiotic development of TB and starter streptococci resulted in higher counts and delayed death of bacteria. Str. paracitrovorus and Str. diacetilactis are considered essential components of starters for small rennet cheeses. SKK

7 P 1245
A study of the symbiosis between micrococci and lactobacilli occurring in Cheddar cleese.
Nath, K. R.
Dissertation Abstracts International. Section B. The Sciences and Engineering 31 (2) 743: Order n 70-5806 (1970) [En] [Cornell Univ., Ithaca, New York, USA]
Acid production by lactobacilli was stimulated by a capsular material from 12 micrococci and 6 anaerobically mannitol-fermenting, coagulase-negative, Gram-positive cocci isolated from cheese. The material was rich in N-acetyl hexosamine, low in total N and contained riboflavin or a related compound. Fractionation on G-50 Sephadex produced a simil material from Cheddar cheese extracts. Material eluted with pyridine acetic acid pH 5.1 was shown to be similar to the capsular material by chromatography and UV spectroscopy. Fractions produced from the action of micrococcal intracellular proteinases on casein and its fractions did not stimulate lactobacilli. Intracellular proteinases selectively attacked β-casein whereas extracellular proteinases which were produced by only 3 out of 19 isolates, preferentially attacked α-casein. N-acetyl hexosamine-containing fractions, of relatively high mol. wt., from cheese extract fractions also stimulated acid production by lactobacilli. The stimulation is regarded as due to symbiosis between 2 organisms. GECV

8 J 1005
Growth and activity of lactic-acid bacteria in soyamilk. I. Growth and acid production.
Angeles, A. G.; Marth, E. H.
Journal of Milk and Food Technology 34 (1) 30-36 (1971) [31 ref. En] Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

Growth and acid production of 13 spp. of lactic acid bacteria was determined in (i) soya milk with 1.9% fat and 3.58 protein, (ii) cows' milk (adjusted with skim-milk to 1.8-1.9% fat) and (iii) Elliker's broth. Only 3 spp. showed highest growth rate in (ii). Rate of acid production by 4 Streptococcus spp. was higher in (ii) than in (i) or (except for Str. diacetilactis) in (iii); rate of acid production by the 2 Leuconoctoc spp., 1 Pediococcus sp. and 5 of the 6 Lactobacillus spp. was lowest in (ii). Titratable acidity after 16 h was highest in (ii) with 3 of the Streptococcus spp., and highest in (i) with L. pentosus; all other spp. produced highest titratable acidities in (iii). Addition of 1% glucose to (i) enhanced acid production by most spp., but 1% sucrose had no stimulatory effect; 1% lactose had a stimulatory effect on Str. lactis, Str. cremoris and Str. diacetliactis; 1% peptone stimulated Leuconostoc spp. and L. pentosus; and 1% whey and 1% casitone stimulated acid production by about half of the 3 spp. It is bacteria. CDA
heated at 80°C coincided with development of a

8 J 1006
Growth and activity of lactic-acid bacteria in soyamilk. II. Heat treatment of soyamilk and culture activity.
Angeles, A. G.; Marth, E. H.
Journal of Milk and Food Technology 34 (2) 63-68 (1971) [23 ref. En] [Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

Soymilk was given different heat treatments and then evaluated as a substrate for acid production by lactic acid bacteria. Unheated soymilk elicited optimal or nearly optimal activity from most test cultures. Heating the medium to 60°C resulted in increased acid formation by Streptococcus and Leuconostoc species and in a reduction of acid production by Pediococcus cerevisiae and Lactobacillus species. Extended heating of soymilk at 60°C reduced its suitability as a substrate for acid development by lactic acid bacteria. Acid formation by all cultures was minimal in soymilk heated at 80°C from <1 to 60 min. Responses in soymilk heated at 100°C for short durations were similar to those obtained when soymilk was heated at 80°C. More severe heating at 100 or 120°C progressively improved the quality of soyamilk as a substrate. Inhibitory effects noted when soymilk was heated at 80°C cancided with development of a markedly higher concn. of sulphydryls and/or toxic volatile sulphides in the medium during heating. Beneficial effects of more severe heating were attributed to expulsion of sulphides, a concurrent decrease in concn. of sulphydryls, and a decrease in the oxidation-reduction potential of the medium. AS

8 J 1007
Growth and activity of lactic-acid bacteria in soyamilk. III. Lipolytic activity.
Angeles, A. G.; Marth, E. H.
Journal of Milk and Food Technology 34 (2) 69-73 (1971) [31 ref. En]

The following lactic acid bacteria, when tested with the agar-well method, were able to hydrolyse tributyrin and triolein, but not soybean oil: Streptococcus lactis, Str. cremoris, Str. diacetilactis, Str. thermophilus, Leuconostoc mesenteroides, Pediococcus cerevisiae, Lactobacillus delbrueckii, L. casei, L. pentosus, and L. brevis. Tributyrin only was hydrolysed by L. helveticus. Some free fatty acids were liberated by L. casei, L. debruekii, and Str. thermophilus in soymilk (1.9% soybean lipids) and in MRS broth fortified with 2.0% soybean oil during a 14-day period of incubation. Although L. casei and L. delbrueckii were more active in soymilk than was Str. thermophilus, they released ~10% of the amount of free fatty acids liberated by Candida lipolytica during a similar incubation period. AS

8 P 1262
[Increasing resistance of lactic acid bacteria to antibiotics.]
Pyatnitsyna, I. N.; Bannikova, L. A.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 26: 23-29 (1968) [8 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Natural and evoked resistance to penicillin and streptomycin were determined for strains of Lactobacillus acidophilus, enterococci and Streptococcus thermophilus of intestinal origin. The results are tabulated and discussed. Strains with enhanced resistance retained this property during culturing for 4 yr in antibiotics-free milk. Starters for prostokvasha, resistant to 40 units penicillin and 3000 units streptomycin/ml were obtained by combining strains of lactic acid bacteria of intestinal origin with enterococcus strains with enhanced resistance to the antibiotics. Liquid prostokvasha of creamy consistency, obtained by adding the starter to pasteurized milk (i) is recommended for re-establishment of normal intestinal flora in sick persons and its maintenance in healthy persons. Dried prostokvasha, prepared from starter-treated conc. pasteurized milk containing 45% TS, and given to children treated with antibiotics for various illnesses, prevented intestinal complications that occasionally accompany antibiotic therapy. SKK

8 P 1263
[Effect of heat treatment of milk on activity of introduced Streptococcus lactis.]
Maksimova, A. K.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 62: 88-97 (1968) [5 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Batches of milk from the Institute's farm were autoclaved at 120°C for 7-10 min or heated to 85-90°C for 15-30 min under laboratory conditions. Batches of bulk milk commercially heat treated at 72-75°C for 20 sec, at 85°C for 10 min or at 95°C for 20 min were also obtained. 24-h cultures of 2 strong acid-producing strains and 2 weak strains of Str. lactis were inoculated at 1% into samples of laboratory pasteurized milk and at 5% into the commercial samples. The inoculated samples were incubated at 30°C, and titratable acidity, free amino acid content and bacterial counts were determined during fermentation. The intensity of acid formation and proteolysis was directly related to the amount of free amino acids present at the beginning of fermentation. Greatest initial amounts of amino acids were in milk heat-treated at 72-75°C for 20 sec. The 2 weak strains of Str. lactis were more sensitive to the amino acids effect than the 2 strong strains. SKK

8 P 1276
Dietary or health yoghurt.
Davis, J. G.
Dairy Industries 35 (12) 827-30 (1970) [26 ref. En]

The therapeutic properties of Lactobacillus acidophilus for certain intestinal disorders are described and the manufacture of a dietary yoghurt containing this organism is discussed. The legal aspects of labelling and defining a dietary yoghurt are also discussed. The manufacture of a low-acid yoghurt which might be more acceptable commercially, by restricting incubation at 42-44°C to 30 min, adding a little rennet and cooling quickly to <30°C, followed by cooling <5°C is described. The resulting product is similar to a junket. It is suggested that yoghurt could be used conveniently as a fortified food to supply extra vitamins, Ca, fluoride and essential fatty acids. MMM

8 P 1291
[Microflora of Vacherin Mont d'Or cheese.]
Masson, A.
Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene 61 (3/4) 260-66 (1970) [3 ref. Fr] [Lab. Cantonate, Lausanne, Switzerland]

4 mature cheeses varying from 400 to 650 g in wt., were purchased in Lausanne and subjected to bacteriological analysis. None was pasteurized, as indicated by phosphatase reaction, and all had a large microbial content (250×10^6 to 1.8×10^9/g) the dominant species being as follows: Citrobacter freundii and C. intermedium amongst the coliforms; micrococci of the Baird-Parker Group II; Saccharomyces exiguus amongst the yeasts; and Streptococcus faecalis and Str. faecalis var. liquefaciens amongst the enterococci. There were no lactic streptococci, and few pathogenic bacteria such as staphylococci. IFlaC

8 P 1301
Isolation of nitrosoguanidine-induced mutants of Streptococcus diacetilactis with enhanced ability to produce acetoin and diacetyl.
Chuang, L. F.; Collins, E. B.
Journal of Dairy Science 54 (2) 282-83 (1971) [9 ref. En] [Dept. of Food Sci. and Tech., Univ., Davis, California 95616, USA]

A 48-h culture of Str. diacetiltctis 18-16 in citrate broth was treated with N-methyl-N'-nitro-N-nitrosoguanidine using a method based on that of Adelberg et al. [Biochem. Biophys. Res. Comm. (1965) 18: 788]. Plate counts on lactose/citrate agar showed that ~80% of the Str. diacetilactis survived nitrosoguanidine treatment. Mutants with enhanced ability to produce acetoin and diacetyl could be identified by addition of 0.5% creatine or 0.5% creatinine to the agar; they formed slightly pink colonies, which were smaller and flatter and some had a ring near the centre. The mutants produced acid more slowly than the parent culture, but produced 4.2 μg acetoin + diacetyl/ml in 33h vs. 2.4 μg/ml produced by the parent type. Mutants reverted to the parental type after subculture in litmus milk at 10-day intervals for 2 months. CDA

8 P 1355
[Digestion of casein and its -β- and $\varkappa$-fractions by proteolytic enzymes of Streptococcus lactis and Str. diacetilactis.]
Libudzisz, Z.; Metodieva, D.
Roczniki Technologii i Chemii Zywonsci 19: 133-39 (1970) [13 ref. Pl, en] [Katedra Mikrobiol. Tech., Politechnika, Lodz, Poland]

Digestion by cell-free extracts of Str. lactis and Str. diacetilactis (each grown on media with and without Difco Bacto-protone) of BDH soluble casein and of α_s-, β- and γ-casein prepared by the authors was studied after 24 and 48 h incubation at 30°C using the tannin precipitation method [See Mejbaum-Katzenellenogen et al., Acta biochim. pol. (1966) 13 (1) 87-95]. Digestion mixtures were also fractionated by starch gel electrophoresis in urea [See Wake and Baldwin, Biochim. biophys. Acta (1961) 47 (2) 225-39]. Extracts from both spp. digested casein more rapidly than its fractions; proteolytic activities varied with age of culture and type of medium. Electrophoresis of digestion mixtures indicated the presence of both peptidases and proteases in the extracts. SKK

8 P 1364
[Quantitative characteristics of the microflora of kefir cultures.]
Babina, N. A.
Molochnaya Promyshlennost' 32 (2) 18-19 (1971) [Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Commercial kefir grains were cultured by the established procedure of the all-Union Dairy Industry Research Institute and the microbial composition of the culture was determined 2× during ripening and 1× during storage of the ripe culture. Contents of (i) mesophilic lactic streptococci (Streptococcus lactis), (ii) aroma-forming streptococci (Str. paracitrovorus, Leuconostoc dextranicum), (iii) acetic acid bacteria, (iv) yeasts, and (v) thermophilic lactobacilli in 1 ml ripe culture were of the order of (i) 10^8-10^9, (ii) 10^7-10^9, (iii) 10^5-10^6, (iv) 10^5-10^6, and (v) 10^5-10^6. Streptobacteria and betabacteria did not exceed a few hundred/ml. SKK

8 P 1368
[Use of starters with mesophilic lactobacilli in butter manufacture.]
Lukovnikova, L. A.; Anatskaya, A. G.
Molochnaya Promyshlennost' 32 (2) 15-17 (1971) [7 ref. Ru] [Sibirskii Filial Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

In continuation of earlier work on Lactobacillus plantarum + Streptococcus diacetilactis symbiotic butter starters [See Lukovnikova, USSR Pat. 195 858 (1967) and Lukovnikova & Kapotina; Moloch Prom. (1968) 29 (1) 4-5], it was found that addition of Str. cremoris as a 3rd starter component increased lactic acid formation without impairing the aroma producing properties of the starter. Best results were obtained by culturing the starter (proportions of components not stated) at 25-28°C in skim-milk (16% TS) supplemented with mineral salts, yeast autolysate and glucose. Cells were harvested after 16-20 h incubation, separated by centrifuging, suspended in skim-milk (16% TS) and spray dried. The dried starter was suitable for industrial use and was found superior under manufacturing conditions to customary streptococcal starter; butter produced with the new starter had higher plasma acidity, contained more volatile acids and diacetyl and received a higher organoleptic grading. SKK

8 P 1373
[Effect of rennet on bitterness development in cheese.]
Zvyagintsev, V. I.; Gudkov, A. V.; Tolkachev, A. N.; Buzov, I. P.
Molochnaya Promyshlennost' 32 (2) 19-22 (1971) [16 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

A commercial rennet preparation was mixed with a 1:1 aqueous glycerol solution, and held for 24 h at room temp.; the mixture was then filtered and the filtrate was fractionated into 7 fractions on Biogel P-30 (Bio-Rad Laboratories). Determination of the proteolytic activities of the fractions at pH 1.8 and 7.0 and of rennetting activities at pH 6.6 and 7.3 showed that pepsin was conc. in fractions 2, 3 and also 4 and that rennin was present only in fraction 3. No bitterness developed when any of the fractions were incubated in skim-milk with chalk either alone or in the presence of Streptococcus cremoris Eg. However, when incubation was in the presence of Str. lactis 4063, marked bitterness developed with fractions 2 and, particularly, 3. Further tests showed no bitterness development when pepsin was incubated in milk either alone or with rennet and or Str. cremoris, but that it developed under the same conditions when Str. lactis replaced Str. cremoris. It is concluded that bitterness results from interaction between the pepsin component of rennet and some strains of lactic stretpococci. and that appearance of the fault in cheese may be prevented by choice of suitable starter streptococci. [See also FSTA (1970) 2 12P1883 and Klimovski et al., Moloch Prom. (1969) 30 (6) 10-14.] SKK

8 P 1380
[Factors affecting late fermentation of Grana cheese.]
Bottazzi, V.
Annali della Facolta di Agraria, Universita Cattolica del Sacro Cuore, Milano 9 (3) 466-87 (1970) [It] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolic adel Sacro Cuore, Milan, Italy]

In this lecture, the author discusses the effect, on late fermentation of Grana cheese, of the following factors: microflora of the milk; pH of Lactobacillus cultures and their ability to produce H_2O_2; oxidative characteristics of lactobacilli; and mastitis milk. HBr

S P 1383
Abstracts of papers presented at the Southern Divisional Meeting of the American Dairy Science Association, Jacksonville, Florida, January 31 to February 3, 1971.
United States of America, (American Dairy Science Association)
Journal of Dairy Science 54 (3) 448-59 (1971) [En]

Papers presented at the meeting included the following: Psychrotrophic sporeforming bacteria in raw milk supplies, by B. H. Chung & R. Y. Cannon (p. 448); Effect of heat treatment on the growth of selected psychrophilic bacteria in milk, by E. H. Youssef, J. D. Ortego & J. H. Gholson (pp. 448-49); Effect of incubation temperature on growth rate and fermenting capacity of lactic acid streptococci, by K. L. Smith, A. J. Baggott, Jr. & L. E. Mull (p. 449); Age of raw tank milk related to bacterial count and to Wisconsin mastitis test, by E. W. Custer (p.449); Microbiological and somatic cell assay of milk from commercial dairy herds, by J. W. Pankey, Jr. & W. N. Philpot (p. 449); Quality and yield of Cottage cheese made with high-acid and low-acid starters, by E. J. Connoly & J. H. Martin (p. 450); Development of a nutritious drink made from fresh whey, by R. Laonipon & J. T. Cardwell (p. 450); Manufacture of Mexican type cheese, by R. L. Selman, Jr. & M. L. Poples (p. 450); and Iodine content of milk and forage, by R. W. Hemken, Oskarsson, L. R. Fryman & J. H. Vandersall (pp. 450-51). CDA

8 P 1413
[Synthesis of proteins and vitamins by bacteria and moulds on a whey base for fodder enrichment.]
Bednarski, W.; Jakubowski, J.; Poznanski, S.; Surazynski, A.
Lait 50 (495/496) 285-303 (1970) [14 ref. Fr, en]

S P 1416
Fermentation of milk by Lactobacillus bifidus.
Brown, C. D.; Townsley, P. M.
Canadian Institute of Food Technology Journal 3 (4) 121-29 (1970) [58 ref. En, fr] [Dept. of Food Sci., Univ., Vancouver, British Columbia, Canada]

Bacteria, belonging to the L. bifidus group were isolated from rectal swabs obtained from healthy babies receiving breast milk. The fermentation properties of these bacteria were studied in cows' milk. 5 strains selected for intensive study produced 1.14-1.25% lactic acid and <0.05% volatile acids; they could be cultured readily and coagulated milk in <24 h when using a 5% inoculum. After the original faecal isolation, no special anaerobic condition was required for bacterial growth. A change in bacterial morphology from the branched to the unbranched form was accompanied by a change in the ability to produce lactic acid. Gas production was not effected by the latter morphological transformation. A great deal of variability in morphology, growth consistency, vigour and acid production was observed among the bacterial strains. However, the L. bifidus population from Caucasian babies was not noticeably different from those found in native Indian babies. All of the 5 selected strains utilized inulin, dextrin, mannitol and melezitose. A 24-h culture of fermented milk yielded a product with a mild pleasant natural flavour [slightly sour with a hint of diacety] which could conceivably be altered if desired by adding sweeteners or flavouring agents. AS

9 J 1171
Growth and activity of lactic acid bacteria in soymilk. IV. Proteolytic activity.
Angeles, A. G.; Marth, E. H.
Journal of Milk and Food Technology 34 (3) 124-28 (1971) [41 ref. En] [Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

3 methods were examined for their suitability to measure proteolysis brought about by microbial activity in soymilk. The Anson (or Hull) method, [J. Dairy Sci. (1947) 30: 881-84], a colorimetric measurement of tyrosine and tryptophan, was not able to measure changes detectable by other methods and hence did not appear applicable for this work. Determination of non-protein nitrogen (NPN) [Cereal Chem. (1940) 17: 447-57] to follow proteolytic changes in soymilk was feasible but was time- and labour-consuming. Dye-binding methods [J. Dairy Res. (1961) 28: 43-55 & J. Dairy Sci. (1966) 49: 504-06] were found most workable. Lactobacillus delbrueckii and Streptococcus thermophilus exhibited proteolytic activity in soymilk but L. casei did not. 2 other microorganisms, Bacillus cereus and Micrococcus conglomeratus, and rennet were comparatively mo proteolytic in soymilk than lactic cultures. [See FSTA (1971) 3 8J1007 for part III.] AS

9 P 1436
Mechanisms of lactose utilization by lactic acid bacteria: enzymic and genetic studies.
McKay, L. L.
Dissertation Abstracts International. Section B. The Sciences and Engineering 30 (10) 4725: Order no. 70-5178 (1970) [En] [St. Univ., Corvallis, Oregon, USA]

The specific activities of whole, solvent treated and of cell-free extracts of several different spp. of lactobacilli, grown in lactose broth to stimulate β-galactosidase activity, were compared using the chromogenic substate o-nitrophenyl-β-D-galactopyranoside to investigate the role played by the enzyme in rate of acid production in milk by lactobacilli. Of those tested. Lactobacillus helveticus possessed the greatest activity; optimum temp. for the enzyme in a cell-free extract was 50°C and the optimum pH was ~6.6 using 0.05 M sodium phosphate buffer at 59°C. Galactose was not as effective an inducer as lactose. The mechanism of lactose utilization was studied in (i) Streptococcus lactis C_2F and (ii) Str. lactis 7962 and their lactose-negative mutants using a non-metabolizable lactose analogue, thiomethyl-β-D-galactoside, to measure the transport process; (ii) was able to hydrolyse lactose to glucose and galactose, whereas (i) was not. BEPC

9 P 1439
Effect of humidity on the fate of the microflora of milk on stainless steel surfaces.
Barnhart, H. M., Jr.; Maxcy, R. B.; Georgi, C. E.
Food Technology 24 (12) 1385-89 (1970) [11 ref. En] [Dept. of Food Sci. and Tech., Univ., Lincoln, Nebraska 68503, USA]

The effects of (i) 12%, (ii) 50% and (iii) 80% RH on survival of the microflora in films of raw milk on stainless steel surfaces at 10, 20 and 30°C were studied. After exposure for 16 h at the 3 temp. respectively, total survival was (i) 64, 30 and 24%, (ii) 92, 98 and 124%, and (iii) 64, 30 and 38%. When incubation at 20°C was extended to 72 h and survivors determined at 12-h intervals, % survival after 24, 48 and 72 h respectively were (i) 34, 20 and 30, (ii) 16, 13 and 7, and (iii) 49, 26 and 21. The composition of the microflora showed little change during the 1st 36 h at 20°C, but thereafter micrococci and streptococci were favoured. Pitted surfaces were more favourable for survival and growth of micro-organisms than were smooth surfaces, survival after 16 h at 20°C on the 2 types of surface respectively being (i) 98 and 90%, (ii) 130 and 84% and (iii) 122 and 110%. CDA

9 P 1447
[New method for preparation of bacterial starters.]
Bannikova, L. A.; Pyatnitsyna, I. N.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti 26: 12-23 (1968) [Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

A method for preparation of (i) a lactic streptococci starter for tvorog and (ii) a Lactobacillus acidophilus starter for acidophilus milk, is described. The culture medium consisted of a buffered mixture of tvorog whey (separated by decantation from protein after preliminary sterilization, and neutralized) and pancreatin-hydrolysed skim-milk, supplemented with autolysed yeast and trace elements. (i) was cultured at 28-30°C for 16-18 h, and (ii) was cultured at 37-40°C for 12-15 h. Before the end of incubation, pH was brought to 6.0-6.2 and 2-3 h later, cells were separated by continuous centrifugation at 12 000 × g. For dried starter preparations, the cells were dispersed in skim-milk or buffered sucrose solution and freeze-dried, or spray-dried in a laboratory drier, or mixed (1:15) with dried sterile starch. For liquid starters, (i) and (ii) cells were dispersed in 4 or 2% NaCl respectively or in 2% starch solution; these dispersions could be stored at 4-6°C for up to 1 month. SKK

9 P 1448
[Fermented milk drink.]
Kyoto Yakuruto Co. Ltd.
Japanese Patent 261/71 (1971) [Ja]

Heat sterilized sugar is spun to yield fine fibres, which are dissolved in milk cultured with lactic acid bacteria. IFT

9 P 1474
[Production of carbonic acid by lactic acid bacteria.]
Waes, G.
Lait 51 (503/504) 123-34 (1971) [10 ref. Fr, en] [Sta. Laitiere de l'Etat, Melle, Belgium]

Carbonic acid production by 3 BD starters (Flora Danica, Wilken and Hansen starters) was estimated by manometric measurement of CO_2 production after incubation for 16-24 h at 20°C. Duration of incubation had no appreciable effect on CO_2 production. Rate of CO_2 production was slower in Wilken starter than in the other 2 starters. Flora Danica starter was affected by incubation temp. and produced less CO_2 after incubation at 30°C than at 20 or 25°C (~300 vs. ~500 µl CO_2); the other 2 starters produced ~450 500 µl CO_2 after incubation for 20 h at any of the 3 temp. Preservation of the 3 starters by frozen storage at -20 and -30°C for 5 months had no adverse effect on CO_2 production. Addition of 0.1 ppm Mn, as $MnSO_4$, increased the rate of acid production in 5 slow CO_2-producing starters. CDA

9 P 1475
A comparative study of the activity of starter cultures in different types of milk.
Dutta, S. M.; Kuila, R. K.; Ranganathan, B.; Laxminarayana, H.
Milchwissenschaft 26 (3) 158-61 (1971) [10 ref. En, de] [Nat. Dairy Res. Inst., Karnal, India]

18-h cultures of (i) Streptococcus diacetilactis, (ii) Str. cremoris, (iii) Str. lactis, (iv) Str. thermophilus, (v) Str. faecalis and (vi) Lactobacillus bulgaricus were inoculated into various skim-milks and incubated for 24 and 48 h at 30 or 37°C; milks tested were cows', buffaloes' and goats' skim-milk, reconstituted spray-dried skim-milk from the Dairy Res. Inst. at Karnal, and skim-milk reconstituted from 3 commercial brands of dried skim-milk. Production of volatile acids by cultures (ii)-(iv) was poor, irrespective of the type of milk: volatile acidity after 24 and 48 h incubation was generally lower in buffaloes' and goats' skim-milk than in the other milks for all cultures. Max. diacetyl (51 ppm after 24 h and 43.4 ppm after 48 h) was produced by (i) in cows' skim-milk; (iii), (v) and (vi) did not produce significant amounts of diacetyl in any of the milks. Proteolytic activity varied with culture and with type of milk, but (v) exhibited the greatest proteolytic activity in all types of milk. The importance of selecting a suitable brand of dried skim-milk for ensuring uniformity and stability in biochemical activity of starter cultures is emphasized. CDA

9 P 1477
[Lactic acid beverage.]
Asahi Chemical Industries Co. Ltd.
Japanese Patent 1179/71 (1971) [Ja]

Milk is inoculated with Lactobacillus helveticus, and the mixture inoculated with Saccharomyces lactis and incubated. IFT

9 P 1537
Nature and behavioural characteristics of acid whey powder.
Mavropoulou, I. P.
Dissertation Abstracts International. Section B. The Sciences and Engineering 31 (4) 2044: Order no. 70-17465 (1970) [En] [Cornell Univ., Ithaca, New York, USA]

7 samples of dried whey were analysed. Properties investigated included total and soluble protein fractions, amino acids (free or derived from peptides soluble in 15% trichloroacetic acid), fat (including fat-bound P, phospholipids and neutral lipids), the vitamins thiamine, riboflavin and ascorbic acid, ash, moisture, inorganic elements, titratable acidity and pH. The effect of storage on the oxidation, colour and flavours of the dried whey was assessed together with their stimulatory effect on Lactobacillus bulgaricus, L. helveticus and Streptococcus thermophilus and on mixed lactic acid cultures used in cheese and yoghurt. AH

9 P 1552
[Effect of growth temperature on bacterial composition of starter mother culture.]
Anderson, I.
Svenska Mejeritidningen 63 (3) 49-50 (1971) [3 ref. Sv] [SMRs Centrallaboratorium, Malmö, Sweden]

The relative development of Streptococcus cremoris, Leuconostoc citrovorum and Str. diacetilactis in 2 Swedish cultures and of Str. cremoris and Leuc. citrovorum in a Dutch culture, were compared following 7 successive inoculations at temp. of 18, 21 and 24°C. The proportion of Leuc. citrovorum organisms present in the Dutch culture was not affected by temp. of growth, but that in the Swedish cultures fell markedly as the growth temp. was raised, yielding place to Str. diacetilactis. Where the balance between these 2 groups of organisms in a mother culture has become disturbed, a condition indicated by presence of a high acetoin content, the growth temp. should be lowered by 1-2°C. GTP

9 P 1553
Develops unique cultured dairy product.
Ziemba, J. V. (Editor)
Food Engineering 43 (4) 50-51 (1971) [En] [120 S. Riverside Plaza, Chicago, Illinois 60606, USA]

Yogo developed by Gaymont Laboratories Inc., Chicago, USA, is a low-fat (1%) low-calorie (half that of ice cream) high-protein (5× that of ice cream) frozen cultured dairy product flavoured with chocolate, vanilla or various fruits and packaged in 1-pt or 4-oz polyethylene-coated paperboard containers. It bears a close resemblance in consistency, taste and mouth-feel to ice cream, has a 50% over-run and its manufacture is similar to that of ice cream. Ingredients are blended and pasteurized at 185°F for 30-40 min in 1000 gal vats, homogenized at ~2500 lb/in², cooled, inoculated with a culture containing Lactobacillus bulgaricus and Streptococcus thermophilus, incubated and cooled. Fruit, sugar, stabilizers and other ingredients are added and the mixture frozen and filled into containers which are stored at -20°F for 48 h before being packed and shipped. JA

9 P 1571
[Increasing the resistance of pure cultures of lactobacilli to nisin.]
Hylmar, B.; Teply, M.; Tesarkova, H.
Prumysl Potravin 21 (12) 390-93 (1970) [19 ref. Cs, de, ru, en] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

By gradual adaption of Lactobacillus casei to increasing amounts of nisin in a culture medium consisting initially of full-cream milk enriched with 5% of molasses base, 200-300 units of nisin/ml had ultimately shown no inhibitory effect. Adequate fermentation and proteolytic activity of this nisin resistant Lactobacillus strain was retained in the presence of 200 units of nisin/ml and is recommended for fermentation and proteolysis in the manufacture of Edam cheese when nisin is incorporated for the inhibition of butyric acid producing clostridia. The original Lactobacillus culture was shown to be completely inhibited by 50 units of nisin/ml of milk. OA

10 P 1634
Characterization of growth stimulants in corn steep for lactic streptococci.
Johnson, E. C.; Gilliland, S. E.; Speck, M. L.
Applied Microbiology 21 (2) 316-320 (1971) [12 ref. En] [Dept. of Food Sci., Raleigh, North Carolina 27607, USA]

Acid production at 32° C by single-strain lactic streptococci in 10% reconstituted skim-milk with and without addition of 0.05% corn steep liquor was (as h to reach pH 5.0): Streptococcus lactis AC_2, 6.0 and 7.2; Str. cremoris C_3, 5.7 and 6.6; Str. cremoris ML_2, 4.5 and 6.5; Str. cremoris AEB_{11}, 6.3 and 7.5; and Str. lactis HI, 8.9 and 20.0. R_F values and UV absorption max. and min. are given for 4 major stimulatory components separated from the liquor by ion exchange, and purified by paper and column chromatography. Only 1 component was detectable by ninhydrin, the remainder were detectable by bioautographic analysis of chromatogram strips. Origin and constitution of the substances, which did not contain pentoses, suggesting that they were neither nucleosides nor nucleotides, is discussed; it is suggested that they might be purine or pyrimidine bases. 2 of the components apparently originated in the whole corn, while the other 2 may have been synthesized during the steeping process or be hydrolysis products of a non-stimulatory component of corn. BEPC

10 P 1639
The utilization of bacteria in milk products. [A lecture]
Hehir, A. F.
Food Technology in Australia 22 (10) 582-583 (1970) [1 ref. En] [Dept. of Agric., Adelaide, S. Australia]

Utilization of Streptococcus lactis and Str. cremoris in starters for Cheddar cheese manufacture, the role of certain bacterial species in development of Cheddar cheese flavour, and the utilization of certain bacteria for production of fermented milk products are briefly and simply discussed.. CDA

10 P 1657
[Starter for producing Rossieskie cheese.]
Gudkov, A. V.; Fedin, F. A.; Ramazanova, O. P.
(Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Svrodel'noi Promyshlennosti
USSR Patent 284 594 (1970) [Ru]

The starter contains mesophilic lactic acid bacteria including Streptococcus lactis, Str. cremoris and Str. diacetilactis. To obtain cheese according to a process involving the addition of all the salt to the curd, the starter includes salt-resistant lactic acid bacteria, enterococci, which ensure acidification and accumulation of aroma substances throughout ripening. W&Co

10 P 1668
[Micro-organisms causing pickled cheese defects.]
Tsaneva, K.
Molochnaya Promyshlennost' 32 (4) 43-45 (1971) [4 ref. Ru] [Tsentral'naya Lab. Molochnoi Promyshlennosti, Sofia, Bulgaria]

Lactobacillus plantarum var. rudensis was established as the cause of rusty discoloration in Bulgarian White pickled cheese (Bryndza) [see Chomakov, Mikrobiologiya (1962) 31 (4) 726-30]. This article reports a detailed study of growth and pigment formation of 40 strains of the micro-organism isolated during large outbreaks of the defect in Bulgarian cheese factories. The causes of pigment production could not be adequately explained and a search for preventive measures, including introduction of different starters, was unsuccessful. It is recommended that production in cheese factories be interrupted when the defect appears and resumed only after thorough disinfection of premises and equipment throughout the chain of milk production, reception and processing. SKK

10 P 1703
[Effect of yeast No. 304 Torulopsis new type and No. 642 Torulopsis minor on development of lactic acid bacteria.]
Komova, F. T.
Trudy, Vologodskii Molochnyi Institut 60: 13-24 (1970) [21 ref. Ru] [Vologodskii Molochnyi Inst., Vologda, USSR]

3% inocula of Streptococcus lactis 700_{12}, Str. cremoris 128, Str. paracitrovorus 263_8, a strong acid-forming strain of Str. diacetilactis and weak acid-forming Str. diacetilactis 922_9, all components of dried starters for small cheeses from the All-Union Butter and Cheese Ind. Res. Inst., were cultured in sterilized skim-milk alone, or with 2 million Torulopsis No. 304 new type or Torulopsis minor/ml; counts of streptococci and yeasts were made after 4, 8 and 24 h and 3, 5, 10, 15 and 25 days at 28°C. Development of streptococci was enhanced and death rate reduced by the presence of Torulopsis, their numbers in 25-day cultures being 100-500 × greater than in control cultures without yeast. Taste and aroma of milks inoculated with the starter streptococci were not affected by the presence of Torulopsis but Eh was lower when yeasts were present and conc. of non-protein N and amino N after 25 days were 1.07-1.35 × and 1.14-1.37 × higher respectively. From these experiments it is considered that the 2 yeasts may be useful in hard cheese manufacture. SKK

10 P 1704
[Use of some asporogenous yeasts in the manufacture of Dutch and Rossiiskii cheeses.]
Kimova, L. T.
Trudy, Vologodskii Molochnyi Institut 60: 39-44 (1970) [11 ref. Ru]

Dutch cheeses were made with addition of 10% ripened milk, 0.2% starter and 500 000 Torulopsis minor No. 642/ml to the vat milk, the yeast being added either directly to the vat milk or to the ripened milk before ripening. Rossiiskii cheeses were similarly made, yeasts being added before the starter and again to the coagulum before pressing. Control cheeses were made without yeasts. In experimental cheeses, the coagulum was denser, the grain more elastic and curd working time shorter; throughout ripening, they contained more lactic acid bacteria than the control cheeses, particularly when the yeasts were added to the ripened milk, and had lower pH. When ripe, the experimental cheeses contained higher proportions of volatile acids and non-protein N and received higher organoleptic scores. The yeasts began dying out on the 10th- 15th days of ripening and their beneficial effects are ascribed to the initial stimulation of lactic acid bacteria development. (see preceding abstr.) SKK

10 P 1715
[Some factors influencing the degradation of casein in milk.] Der Einfluß einiger Faktoren auf den Aufbau des Caseins in der Milch.
Schalitschev, J. [Shalichev, Ya.]; Nakaschev [Nakashev], K.; Petrowa [Petrova], M.;
Milchwissenschaft 26 (5) 284-288 (1971) [29 ref. De, en] [Inst. für Tierzucht, Sofia-Kostinbrod, Bulgaria]

Casein samples, isolated from unheated milk, from milks heated to 90 C for 20 and 180 min respectively, from yoghurts prepared from them and from similarly heated solutions of casein in pH 6.8 phosphate buffer were examined electrophoretically. Heating of the milk, especially where continued for 190 min, was found to degrade the α- and $\varkappa$-casein fractions considerably, but the β-casein only slightly. Only the casein from milk heated to 90 C for 20 min gave evidence of containing a χ-casein-β-lactoglobulin complex. The yoghurt organisms employed, Lactobacillus bulgaricus and Streptococcus themophilus, appeared unable to degrade the intact casein fractions, but could further degrade and utilize the thermal decomposition products of casein present in the heated milks. GTP

10 P 1736
Influence of heat treatment of skim-milk upon growth of enteropathogenic and lactic bacteria.
Singh, V. K.; Mikolajcik, E. M.
Journal of Milk and Food Technology 34 (4) 204-208 (1971) [10 ref. En] [Dept. of Dairy Tech., St. Univ., Columbus, Ohio 43210, USA]

By use of agar plate count techniques, growth patterns of Streptococcus cremoris R-1, Str. lactis C-2, Str. agalactiae OARDC, enteropathogenic Escherichia coli OSU 66, Salmonella typhimurium OSU 471, and Staphylococc aureus OSU 256 were determined in non-heated skim milk and in skim-milks heated at 62.8°C for 32 min, 80°C for 12 min, and 121°C for 10 min. Calculations were made of the generation time, number of generations, and rate of multiplication expressed as the velocity coeff. k ($k=0.692/$generation time). The k values of the organisms in non-heated skim-milk following 2 h incubation ranged from 0.38 for Str. cremoris to 1.15 for E. coli. Heat treatment of skim-milk stimulated rate of multiplication of the organisms and in most instances better growth occurred in skim-milk heated at 80 or 121° C than in skim-milk heated at 62.8°C. The average stimulation of the growth rate at 2 h upon heat treatment of skim-milk ranged from 9% for Str. agalactiae to 45.5% for Str. cremoris. Str. agalactiae and E. coli were least stimulated by heat treatment of skim-milk and Staph. aureus and Str. cremoris the most Growth inhibitory properties of ono heated skim-milk were dissipated upon incubation for 4-8 h. AS

10 P 1750
Continuous production of yoghurt cultures and stimulation of Lactobacillus bulgaricus by formic acid.
Bottazzi, V.; Battistotti, B.; Vescovo, M.
Milchwissenschaft 26 (4) 214-219 (1971) [13 ref. En, de] [Dept. of Dairy Res., Univ. Cattlica del Sacro Cuore, Piacenza, Italy]

Using UHT-treated milk, the Streptococcus thermophilus: L. bulgaricus ratio could be maintaned between 1:0.5 and 1:3, whereas in autoclaved milk it changed quickly and eventually stabilized at 1:20; the ratio in UHT-treated milk moved towards bacilli when $\geqslant 5$ μg formic acid/m were added. CDA

10 P 1757
[3rd Conference of Austrian cheese advisory personnel held on 14th and 15th Oct. 1970 at the Federal Teaching and Research Institute in Rotholz.] 3. Tagung österreichischer Käsereifachberater am 14. und 15. Oktober 1970 in Rotholz.
Anon.
Milchwirtschaftliche Berichte aus den Bundesanstalten Wolfpassing und Rotholz 1971 (27) 120-170 [De]

Papers presented at the conference included the fellowing Quality tests organized by the Austrian Dairy Board, by G. Drösler (pp. 121-130, ref.); Milk testing in the Tyrol, by R. Riedlr (pp. 131-133); Streptococci - their cultivation and importance for hard cheesemaking, by W. Ginzinger (pp. 135-137); Problems of structure planning in a hard cheesemaking area, by H. Mannhardt (pp. 139-142, 6 ref.);Organization of the marketing of dairy products, by G. Felber (pp. 143-146); Ripening block cheese in films, by J. Hinterberger)pp. 147-153); Agriculture and dairying in Wisconsin (USA), by K. Sumereder (pp. 157-163); Problems of raw milk testing with particular reference to hard cheese manufacture, by A. Furtenbach (pp. 165-168). [See FSTA (1969) 1 12P1315 for previous report.] FL

10 P 1796
[Study of an agent stimulating the growth of lactic starters.]
Weber, F.
Revue Laitiere Francaise 1971 (286) 265, 267-269 & 271-272 (1971) [9 ref. Fr, de, en]

Acid production by Streptococcus lactis at 30°C, Str. thermophilus at 45°C and Str. diacetilactis at 20°C was determined in skim-milk containing 0-2% of a 1/10 dilution of a commercial stimulating agent, Lac-Val (LV, containing essentially a soluble yeast extract). 2% inocula of single-strain cultures were added and acidity was measured hourly. 2% LV resulted in the shortest coagulation time with all 3 organisms. Concn. of LV which had the greatest stimulatory effect on Str. lactis, Str. thermophilus and Str diacetilactis respectively were 0.4-0.8, 0.3-0.4 and 0.3-0.4%. Concn. of 0.6% LV had the greatest stimulatory effect on growth of Str. lactis at 30°C and Lactobacillus helveticus at 45°C. It is concluded that LV stimulates growth of lactic acid bacteria by reducing the lag phase, and that it assures a more rapid and regular acidification of the medium. The properties required during cheese manufacture, particularly the acidity at each stage of the operation, must be taken into consideration when determining the optimum conditions for utilization of the agent. CDA

11 M 1254
[Effect of whey preservation on the quality of dough and finished products.]
Levon, A. V.; Drobot, V. I.; Slyusarenko, T. P.; Roiter, I. M.
Khlebopekarnaya i Konditerskaya Promyshlennost' 15 (1) 10-12 (1971) [Ru] [Kievskii Tekhnologicheskii Inst. Pishchevoi Promyshlennosti, USSR]

Acid production and the growth of yeast in whey stored at 25°C were inhibited by the addition of 0.076% sorbic acid and 1.8% NaCl. The treated whey could be stored for 5-6 days in open or closed vessels without exhibiting any significant changes. When used in bread production, the whey had no adverse effects on the manufacturing process and the resultant bread was of good quality. FL

11 S 1326
[Microbiology of, and biochemical changes in, Parma hams during ripening.]
Giolitti, G.; Cantoni, C.; Bianchi, M. A.; Renon, P.; Beretta, G.
Archivio Veterinario Italiano 22 (2/3) 61-86 (1971) [13 ref. It, fr, de] [Istituto di Ispezione degli Alimenti di Origine Animale, Univ., Milan, Italy]

Parma hams, 2 each time, were examined before and 15 and 30 days after curing, after holding for 60 days at 2°C and after ripening for 1, 2, 4, 6, 7, 8, 10 and 12 months. pH, and contents of salt, lactic acid, free volatile and non-volatile fatty acids, carbonyl compounds, NH_3 N, non-protein N, protein N, free amino acids, H_2S and CH_3SH, as well as total bacterial counts and counts of micrococci, coliforms, halophilic and salt-tolerant micro-organisms, yeasts, corynebacteria, group D streptococci, lactobacilli and clostridia were determined on each occasion in the muscle and adipose tissue parts of the hams. Results are tabulated in detail. SKK

11 S 1356
Microbiological and colour changes during ageing of beef.
Ledward, D. A.; Nicol, D. J.; Shaw, M. K.
Food Technology in Australia 23 (1) 30-32 (1971) [18 ref. En] [CSIRO, Div. of Food Preservation, Meat Res. Lab., Cannon Hill, Queensland 4170, Australia]

Effects of varying O_2 and CO_2 concn. on the growth of spoilage organisms at 36°F on beef semitendinosus muscle were investigated under conditions of min. wt. loss. Wt. loss was minimized by vacuum packing the meat in Cryovac or using moisture impermeable films of MSADT-80 or polyethylene. Under vacuum packaging, the equilibrium atm. was found to consist of 1-2% O_2 and 15-20% CO_2; growth of Pseudomonas was inhibited and the slower growing Microbacterium was the predominant spoilage organism. With controlled atmospheres, greatest bacterial inhibition was obtained by reducing the O_2 concn. to 0.2% in the presence of 25% CO_2 when Lactobacillus type 58 predominated. Meat colour was adversely affected when stored under O_2 concn. $<5\%$ and CO_2 concn. $>25\%$. It is concluded that an atm. of 5% O_2 with elevated CO_2 levels (up to 25%) provides adequate microbiological and colour control of beef during ageing at 36°F. AH

11 T 565
[Studies on halotolerant lactic acid bacteria relating to soy sauce production. II. Effect of l-proline on halotolerance of Tetracoccus 100.]
Jose, H.; Sugimori, T.
Journal of Fermentation Technology [Hakko Kogaku Zasshi] 49 (4) 302-312 (1971) [12 ref. Ja] [Kyoto Res. Lab., Marukin Shoyu Co., Ltd., Uji-Shi, Kyoto, Japan]

Of the various amino acids, nucleic acid bases and vitamins tested, only l-proline facilitated the halotolerance of Tetracoccus 100. The intracellular free proline pool of cells grown on l-proline-enriched hypertonic saline medium was markedly larger than that of normally grown cells, whereas no significant difference was found between their cell-bound proline contents. Regardless of l-proline added to the culture medium, cells grown on a hypertonic saline medium contained ~1.0M NaCl in their cell sap. The intracellular NaCl concn. in the cells grown on an ordinary medium was 0.4M. The deterioration of lactic acid fermentation caused by a high concn. of salt was partly restored by the presence of l-proline. By the addition of an adequate amount of l-proline to the hypertonic saline medium, the organism acquired halotolerant properties for its respiration and fermentation. HK

12 G 478
[Studies on the preparation of a cheese-like product from soybean milk.]
Kim, C. S.; Shin, H. S.
Korean Journal of Food Science and Technology 3 (1) 57-63 (1971) [17 ref. Ko, en] [Dept. of Food Tech., Coll. of Eng., Dong Kuk Univ., Seoul, S. Korea]

Of 5 lactic acid bacteria examined, Streptococcus thermophilus and Str. diacetilactis produced more acid in soybean milk than Str. lactis, Str. cremoris and Lactobacillus bulgaricus. Soybean milk and dried skim-milk were combined in a ratio of 7:3 and were subjected to lactic acid fermentation for 24 h at optimum temp. Results indicated that the yield of precipitant and protein content were high, the moisture content
Comptes Rendus Hebdomadaires des Seances de l'Academie d'Agriculture de France 56 (18) 1470-1474 (1970) [5 ref. Fr]

Whole grapes kept under an atm. of 96% CO_2 were found to absorb a vol. of $CO_2 \leqslant 10\%$ of their own vol. at 35° C, 30% at 25°C and 50% at 15°C. Max. vol. absorbed varied with variety of grape and yr. Average time for absorption of max. vol. was 1.5 h at 35°C, 3 h at 25°C and 8 h at 15°C. The relevance of these findings to winemaking processes is discussed. SAH

12 P 2026
[Characterization of a bacteriophage of Streptococcus thermophilus.] Charakterisierung eines Bakeriophagen von Streptococcus thermophilus
Ciblis, E.
Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, II. Abteilung 125 (6) 541-554 (1970) [14 ref. De, en] [Abteilung für Allgemeine Lebensmitteltech., Univ. Hohenheim Stuttgart, W. Germany]

A phase active against Str. thermophilus was isolated from a commercial yoghurt culture and subsequently from dust, dairy utensils and leaves of beetroots and sugar beet. The infected yoghurt was of low acidity and tasted 'burned'. The phage appeared to be relatively specific, only 2 of 7 strains of Str. thermophilus being susceptible, was Ca-sensitive and contained DNA. Electron microscopy showed that the non-differentiated tail was ~237 nm long, and the head had a diam. of ~70 nm. In one-step growth experiments, the latent period was 80 min, and the yield was ~34 particles/infected bacterium. Phage-resistant mutants of Str. thermophilus were also isolated. Hygienic measures necessary to prevent phage contamination are discussed. BR

12 P 2031
[Solid and liquid media for isolating lactic acid bacteria.]
Kirsanov, G. P.
Molochnaya Promyshlennost' 32 (5) 18-19 (1971) [Ru] [Mordovskii Gosudarstvennyi Univ., Saransk, USSR]

An extract obtained from Penicillium chrysogenum mycelium (a by-product of penicillin manufacture) had the following % composition: total N, 6.3-6.6; protein, 27.0-32.3; amino N, 0.2-0.4; ammonia N, 0.5-0.7; monosaccharides, 7.3-7.8; polysaccharides, 8.3-8.6; crude cellulose, 12.1-12.4; crude fat, 5.7-5.8; lignin-like substances, 20.1-20.6; and ash, 15.1-17.3. A medium said to be suitable for isolation of lactic acid bacteria from milk and milk products was prepared by boiling 8 g dried mycelium in 200 ml water for 15 min, then filtering after a further 30 min at room temp; 160 mg Na_2HPO_4, 480 mg NaH_2PO_4, 500 mg NaCl, 1.5 g lactose, 14 mg DL-methionine and (for the solid medium) 2.5 g agar were dissolved in 100 ml of the conc. extract which was then adjusted to pH 6.5 with 10% NaOH and sterilized for 30 min at 120°C. The heat treatment destroyed residual penicillin activity. SKK

12 P 2032
Growth of Streptococcus lactis in milk in a continuous fermenter.
Linklater, P. M.; Griffin, C. J.
Journal of Dairy Research 38 (2) 127-136 (1971) [11 ref. En] [Dept. of Food Tech., Univ., Sydney, New South Wales. Australia]

Milk was added to a continuous fermenter [see FSTA (1971) 3 11P1914] to maintain a selected operating pH in the range 5.4-6.0, a fermentation system controlled in this way being called a pH-stat. Below pH 5.4, casein coagulated in the fermenter and on the pH electrodes. At pH 6.0, stirring inhibited the growth of the test culture, Str. lactis C10, but the inhibitory effect was reduced and the culture grew satisfactorily when the milk reservoir was sparged with 5% CO_2 in N_2 or with N_2 alone. The dilution rate was highest near pH 6.0, which was close to the optimum pH for the growth of the organism. The rate of production of lactic acid and of bacterial cells in the fermenter was highest at pH 5.4. AS

12 P 2037
Occurrence of bacteriophage in a cheese plant in India.
Nambudripad, V. K. N.
Indian Journal of Dairy Science 23 (3) 188-189 (1970) [8 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

In trials carried out at the National Dairy Research Institute cheese plant at Karnal, whey samples from cheese made with a mixed starter, LF, were tested for inhibitory activity against component strains of the starter. 2 components, one resembling Streptococcus lactis (LF3) and the other resembling Str. diacetilactis (LF8), were inhibited by the whey. Considerable day-to-day variation occurred in the phase titres of the whey, phage active against LF3 dominating on some days and that against LF8 on others. Acid production was only occasionally noticeably retarded in cheeses manufactured with LF mixed starter. CDA

12 P 2070
[Contents of acetaldehyde, acetone, ethanol, acetoin and diacetyl in cream, buttermilk, fresh butter and stored butter from the churning of cream ripened with three mixed cultures.]
Steinsholt, K.; Svensen, A.; Tufto, G.
Meieriposten 60 (32) 677-688 (1971) [8 ref. No. en]

Mean contents (mg/kg) of (i) acetaldehyde, (ii) acetone, (iii) ethanol, (iv) acetoin and (v) diacetyl found by GLC in fresh butter made in 36 churnings with 3 different mixed cultures were 0.35, 0.82, 1.72, 71.46 and 1.79 respectively. Results are also tabulated for cream, buttermilk and butter after storage for 2 months. Average contents of (i), (ii) and (iv) decreased ~6% during churning, (iii) ~4%, while (v) increased ~52%. Contents of (i) and (v) decreased, (ii) and (iii) remained nearly constant, and (iv) increased markedly during storage. Samples with high contents of (i) and (iv) were easily detected in triangular taste tests but the opinion of the judges was divided. Content of (v) giving a max. score (scale 0-5) was 1.1 mg/kg butter; scores in the experiment varied between 2.0 and 3.7. Butter made from cream ripened with mixed Streptococcus cremoris and Leuconostoc citrovorum, both isolated from good quality farm butter, contained less (iv) and (i) than that ripened with a commercial culture of Str. cremoris, Str. lactic and Leuc. citrovorum; butter made using the mixed farm butter culture with the addition of Str. diacetilactis, also isolated from farm butter, contained the highest amounts. All 3 cultures produced similar amounts of (v). [From En summ.] BEPC

12 P 2074
[Microflora of Provolone cheese made with liquid rennet and lipase in comparison with that obtained by the traditional method.]
Mattioli, I.; Corberi, E.; Bergamaschi, P.; Suss, M.
Annali di Microbiologia ed Enzimologia 20 (1/2/3) 31-43 (1970) [8 ref. It, en] [Istituto di Microbiol. Agraria e Tecnica dell' Univ., Milan, Italy]

The effects, on the chemical composition and microflora of Provolone cheese, of replacing the impure rennet paste traditionally used, by a mixture of liquid rennet extract and lipase were investigated. 4 experimental batches made between 15 Feb. 1967 and 21 Nov. 1968 showed that the microflora, as revealed by total count and counts of lactic acid, clostridia and coliform organisms, was much the same in the 2 cheeses. Chemical compositions were also similar except for a higher acetic acid (8.36-28.8 vs. 3.75-16.8% of free fatty acid content) and a somewhat lower butyric acid content (65.2-90.8 vs. 75.7-95.14%) of the cheese prepared with liquid rennet and lipase. Flavour, however, was approximately the same in both. Good Provolone, equal in quality to the traditional and hygienically superior, can apparently be prepared by the newer renneting procedure. GTP

12 P 2104
[Study of new methods of manufacturing dried dairy cultures.]
Hylmar, B.; Teply, M.
Prumysl Potravin 22 (5) 155-157 (1971) [17 ref. Cs, en, ru, de] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

In experiments on fluidized-bed drying of Penicillium roqueforti mycelium in a type F6 drier manufactured by Dioptra n.p. in Turnov, Czechoslovakia, DM contents (%) and contents of live spores (millions/g) after drying for 30, 90 120, 150 and 180 min were respectively (values for fresh material, 41.9 and 3700): 66.7 and 3800; 95.1 and 5100; 9.53 and 4700; 96.1 and 5000; and 96.6 and 4800. Corresponding values for freeze-dried (36 h) material were 96.7 and 4200. The 2 types of dried P. roqueforti and fresh agar cultures gave equally good results in cheese manufacture. For the preparation of dried kefir starters, rennet and the appropriate culture were added to sterile skim-milk and incubated, the coagulum being mixed repeatedly; the coagulum was finally separated, pressed, milled (DM content 35.5%), pre-dried for 2 h at 30°C (DM content, 78.1%) and dried on the fluidized bed for a further 2 h when a DM content of 95.4% was reached. Contents of live streptococci, lactobacilli and yeasts after milling were respectively (millions/g): 3400, 3000 and 4. Corresponding final values were: 700, 600 and 0.2. It is pointed out that the destruction of yeasts, though severe, was less than in freeze-drying. SKK

12 P 2105
Acetaldehyde production by combined yoghurt cultures.
Hamdan, I. Y.; Kunsman, J. E., Jr.; Deane, D. D.
Journal of Dairy Science 54 (7) 1080-1082 (1971) [12 ref. En] [Div. of Animal Sci., Univ., Laramie, Wyoming 82070, USA]

Acetaldehyde production by 3 commercial yoghur cultures in whole milk fortified with 3% dried skim-milk, was determined using the method of Lindsay & Day [J. Dairy Sci. (1965) 48 (6) 665-669], during incubation for 7 h at 45°C and storage for 4 wk at 4°C. Max. acetaldehyde content (22-26 ppm) was reached after incubation for 5 h and declined thereafter. During storage, acetaldehyde decreased to ~14 ppm in 2 of the cultures (Hansen's R1 and Moseley's 405) but remained fairly constant at ~19 ppm in the 3rd (Moseley's 403). The symbiotic relationship between Lactobacillus bulgaricus and Streptococcus thermophilus in yoghurt was demonstrated by measuring acetaldehyde production by the 2 organisms grown separately and in a 1:1 mixture. CDA

12 P 2192
[Cheesemaking process.]
Nikolaev, A. M.
USSR Patent 288 541 (1970) [Ru]

Aroma producing lactic cultures, Streptococcus diacetilactis and Str. paracitrovorus, are used in the starter which is pre-activated before being added to the cheese milk. The curd is treated so that the acidity of the whey is raised by 3-4°T in comparison to that of the whey after cutting the curd. The acidity of the cheese after pressing corresponds to pH 5.15-5.2, and the moisture content is 43-44%. Salting is carried out in 2 stages - firstly by adding NaCl to the mixture of the curd and whey, and finally by treating the pressed cheese with a saturated brine. W&Co

12 U 934
Standards for yoghurt.
Davis, J. G.
Dairy Industries 36 (8) 456-457 & 460-462 (1971) [8 ref. En, fr, de, es]

The author proposes that yoghurts, in any system of specific regulations in the UK, should be classified as of natural, sweetened, flavoured or fruit type and categorized according to fat content (e.g., fat-free, $<0.2\%$; low fat, $\geqslant 0.2$ but $<2.0\%$; medium fat, $\geqslant 2.0$ but $<3.5\%$; and yoghurt, $\geqslant 3.5\%$ fat) or, alternatively, fat content should be required to be stated. A standard of 8.5% SNF is proposed for all yoghurts. Emulsifiers and stabilizers would be prohibited, as would preservatives except for SO_2 and sorbic acid in fruit yoghurts. Cream, butter, dried whole or skim-milk would be permitted within the scope of food labelling regulations, as would use of milk other than cows' milk. Bacteriological and shelf life standards are considered to be best applied as advisory standards within the trade. Simple tests for Lactobacillus bulgaricus and Streptococcus thermophilus are given and mention is made of non-milk 'yoghurts'. BEPC

1 G 26
[Protein production.]
Mizutani, H.
Japanese Patent 12 251/70 (1970) [Ja]
An alcoholic solution of sugar containing an organic acid is inoculated with lactic acid bacteria and fermented in the presence of vegetable protein substances, followed by addition of an O_2 exhausting enzyme. IFT

1 J 33
Separation of the oil and protein fractions in coconut (Cocos nucifera L.) by fermentation.
Puertollano, C. L.; Banzon, J.; Steinkraus, K. H.
Journal of Agricultural and Food Chemistry 18 (4) 579-84 (1970) [24 ref. En] [Coll. of Agric., Univ., Laguna, The Philippines]
Patented and published methods of separating oil and protein from coconut meat by fermentation were studied and combined to devise a better process. Coconuts available commercially vary in maturity and length of storage before processing, and varied in their response to fermentation processing. ~60% of the milks produced from individual coconuts showed a breaking of the emulsion when fermented under controlled conditions. 40% failed to break, indicating that some factor(s) responsible for the coconut milk emulsion stability remained uncontrolled during fermentation. The optimum dilution range for rapid fermentation of coconut milk and separation of the oil and protein was found to be 1:1 to 1:2 (w/v) coconut meat/water. Lactobacillus plantarum effected more rapid separation of oil than L. delbrueckii. The fermentation progressed best under microaerophilic conditions at 40-50°C. The fermentation was successful in breaking the emulsion at a relatively broad range of pH and titratable acidity. AS

1 J 55
[Fermented soy bean milk.]
Takasago Koryo Kogyo Co.
Japanese Patent 12 256/70 (1970) [Ja]
Uncooked soya bean milk is mixed with conidiospores (produced from an Aspergillus microorganism) and lactose or dried skim milk, after which it is heat sterilized and inoculated with a lactic acid starter. IFT

1 L 14
[Microbiological study of irradiated sugar.]
Vajda, O.; Gal, I.
Elelmiszervizsgalati Közlemenyek 16 (3) 129-35 (1970) [11 ref. Hu, ru, de, en, fr] [Fövarosi Elelmiszerellenörzö es Vegyvizsgalo Intezet, Varoshaz u. 9-11, Budapest V, Hungary]
After subjecting crystalline beet-sugar to radiation of 0.5, 1.0 and 2.0 Mrad, microbial counts decreased from the original level (100%) to 40, 20 and 0%, respectively. Radiation gave no protection against later infections. Sterile liquid nutrients containing 4% radiation-treated sugar inoculated with strains of Bacillus cereus,

1 M 151
[Koji preparation.]
Nisshin Flour Milling Co. Ltd.
Japanese Patent 14 880/70 (1970) [Ja]
Powdered starch materials, such as wheat flour mixed with Ca salts, lactic acid bacteria, sugar and nutritional additives, are mixed with seed koji for use in making fermented soya bean paste and soya sauce. IFT

1 S 68
[Investigations of the microflora in prepacked sliced cooked sausages and Bologna type sausages.]
Untersuchungen zur Mikroflora von vorverpackten, aufgeschnittenen Brüh- und Kochwürsten.
Reuter, G.
Proceedings of the European Meeting of Meat Research Workers 15 124-34; (summ. III) 33-34 (1969) [19 ref. De, en, ru] [Inst. fur Lebensmittelhygiene, Freie Univ., Berlin, Germany]
27 different types of sausage were purchased from widely separated locations and examined microbiologically. It was found that the keeping quality could be extended by several days by vacuum packing; lactobacilli were favoured, and other bacterial groups inhibited, as a result of the increased acidity. The effects of contamination, temp. and substrate were studied with a view to improving hygienic procedures. HSi

2 H 123
Enzymatic removal of diacetyl from beer. III. Enzyme protection and regeneration of cofactor.
Thompson, J. W.; Shovers, J.; Sandine, W. E.; Elliker, P. R.
Applied Microbiology 19 (6) 883-889 (1970) [18 ref. En] [Dept. of Microbiol., St. Univ., Corvallis, Oregon 97331 USA]
The preparation and properties of diacetyl reductase and its usefulness in removing diacetyl off-flavour in beer were investigated. A crude preparation of the enzyme was obtained from Aerobacter aerogenes and Streptococcus diacetilactis and purified 2-4-fold by ammonium sulphate fractionation and by chromatography on Sephadex G-200. The purified enzyme was inactivated by lyophilization but the crude extract was active after storage for 4 months at -20°C. The crude enzyme was inactivated by 5% ethanol or pH <5.5. 10% gelation afforded protection to the enzyme in beer of pH 4.1. Provision of the cofactor nicotinamide adenine dinucleotide (NADH), essential for enzymic reduction of diacetyl, was obtained by combining the enzyme with yeast in a gelation film, strips of which could be reused successfully for removing diacetyl from beers. Leakage of yeast cells into the beer was <0.01% after 96 h. The optimal concn. of yeast, gelation and enzyme required to reduce 0.5 ppm diacetyl in spiked beer to 0.12 ppm in 48 h at 5°C was determined. The system was also effective in removing diacetyl from orange juice and from low-proof distilled liquors. AH

2 H 125
[Influence of wort or beer contamination on beer quality. II.] Der Einfluss von Infektionen der Würze bzw. des Bieres auf den Geschmack des Bieres. II.
Prucha, J.; Scheible, E.
Brauwelt 110 (66) 1233-39 (1970) [9 ref. De, en, fr] [Versuchs- und Untersuchungssta. für Gärungsindustrie, Mülheim-Ruhr, W. Germany]
Unaerated and aerated fermentation of 6 different brewing yeasts was tested in small-scale fermentation trials involving experimental contamination with thermobacteria with the aim of studying phenol production. In the unaerated fermentations, a 2-3x increase in phenol content was found. In combination with the acetaldehyde and isoamyl alcohol contents, the phenol produced a sharp, bitter flavour in the beer. Variations in phenol concn. during fermentation are shown graphically. TUB-IGB

2 H 126
[Microbiological problems and filtration in the beverage industry.] Mikrobiologische Probleme und Filtration in der Getränkeindustrie. [A lecture]
Mändl, B.
Schweizerische Zeitschrift für Obst- und Weinbau 106 (17) 418-23 (1970) [De] [Inst. für Tech. der Brauerei II, Tech. Hochschule, München-Weihenstephan, W. Germany]
The author discusses hot and cold sterilization of beverages, in particular beer; metabolism of yeast cells; microorganisms which can live in beer, specifically Sarcina and lactobacilli; turbidity of beer and its causes; and clarification by centrifugation and filtration. JMS

2 H 127
[A new culture medium for the detection of Pediococcus cerevisiae (beer-sarcina).] Ein neuer Nährboden zum Nachweis von Pediococcus cerevisiae (Biersarzinen).
Kleber, W.; Seidl, P.
Brauwelt 110 (31/33) 574 (1970) [1 ref. De] [Wissenschaftliche Sta. für Brauerei, Munich, W. Germany.]
The "Nakagawa Medium" (A. Nakagawa; Bull. Br Sci. (1964) 10: 7-10) has been adopted for use in brewery laboratories. The medium is easily handled and requires no sterilization. After adding the sample, the result can be obtained after 24 to 72 hours at 25° or 37°C. It is possible to carry out anaerobic or aerobic and qualitative or quantitative analyses. TUB-IGB

2 H 128
[Investigation of new and existing media for the detection of pediococci in brewing.] Vergeichende Untersuchungen verschiedener Nährböden zum Nachweis von Pediokokken in der Brauereinetriebskontrolle unter Berücksichtigung eines neuen Nährbodens.
Kleber, W.; Seidl, P.
Brauwelt 110 (61) 1141-43 (1970) [4 ref. De, en, fr] [Wissenschaftliche Sta. für Brauerei eV, Munich, W. Germany]
The new "Nakagawa-medium" was compared with 3 other well-known media for the detection of pediococci in brewery samples. It provides greater economy of effort due to its simple and rapid preparation, the shorter period of incubation and the rapid visual identification of pediococci. TUB-IGB

2 H 129
Use of microbiological media in the brewery.
Murphy, D. T.; Saletan, L. T.
Technical Quarterly, Master Brewers Association of America 7 (3) 182-87 (1970) [10 ref. En, es] [Wallerstein Lab., Staten Island, New York, N.Y., USA]
Membrane filtration of beer for removal of yeast and bacterial contaminants, and flash pasteurization have had great effect during the late 1950's and early 1960's on microbiological quality control in the brewery. General requirements for a microbiological medium, and the most important organisms in a brewery, including Saccharomyces carlsbergensis, Sacch. diastaticus, Lactobacillus delbrückii, Aerobacter aerogenes and L. psatorianus, are listed.
Development of W. L. Nutrient medium, and subsequent modifications are considered.
Suggestions for microbiological quality control (sampling point, frequency of sampling, medium, type of test) are tabulated. PEG

2 H 215
Malo-lactic fermentation in Australian dry red wines.
Rankine, B. C.; Fornachon, J. C. M.; Bridson, D. A Cellier, K. M.
Journal of the Science of Food and Agriculture 21 (9) 471-76 (1970) [14 ref. En] [Wine and Res. Inst., Adelaide, South Australia, Australia]

Malo-lactic fermentation occurred in 62% of 466 Australian dry red wines of 1968 vintage at 6 months of age. In a further 9% of wines the fermentation was still in progress. Wines which had undergone the fermentation were less acid than those which had not. The difference was greater in wines made from Cabernet Sauvignon than from Shiraz or Grenache grapes. The winery in which the wine was made strongly influenced the occurrence of malo-lactic fermentation in a particular wine-growing area, and was the most important factor involved. Incidence of malo-lactic fermentation was closely correlated with the presence of Leuconostoc and Coccus in the wine,but less so with Lactobacillus. Leuconostoc, Lactobacillus and sometimes Coccus occurred together, but no wines contained both Lactobacillus and Coccus. Diacetyl content of the wines ranged from 0 to 7.5 ppm. In wines which had undergone malo-lactic fermentation the mean diacetyl content was 2.8 ppm, compared with 1.3 ppm for wines which had not undergone this. Diacetyl content of wines made from Grenache was not significantly different, with respect to the occurrence or absence of malo-lactic fermentation. The statistical significances of the various inter-relationships between malo-lactic fermentation, type of bacteria present and certain wine constituents are assessed. Estimated of variance components of 11 constitutents of Australian dry red wines are given, and these may be used in designing future sampling surveys. AS

2 J 125
Fermented soya bean food.
Nigeria, Federal Institute of Industrial Research
British Patent 1 193 135 (1970) [En]

A starch mass containing lactobacilli is wet-milled to form a slurry, which is then combined with a slurry of wet-milled, dehulled leguminous material and the mixture fermented and dried to yield a food of high nutritional value with no unpleasant "beany" taste. IFT

2 U 152
[New cheese grading rules of GOZ. First results.]
Posthumus, G.; Kimenai, M. P.
Officieel Orgaan van de Koninklijke Nederlandse Zuivelbond 62 (30) 716-18 (1970) [Nl]

In addition to the standard practice of grading cheese at 6 wk and 3 months, bacteriological and chemical tests are now carried out on 12-day old cheese. A max. of 70 points are assigned for visual and organoleptic quality and a max. of 30 points for bacteriological and chemical results. No differences in quality have so far been observed between cheese made in wooden, and cheese made in plastics moulds; cheese made in the latter tended to have a slightly lower pH and firmer rind at 12 days. Citric acid content was usually low in 12-day old cheese in which many or large holes appeared; they often had high lactobacillus numbers, but the reverse was not always true. Variations in salt content could not be detected by organoleptic testing. The rules also provide for specification of the batch (vat) number in addition to the production date of samples to be sent to the GOZ (Gelders-Overijselze Zuivelbond) laboratory for examination. KH

3 H 281
Malo-lactic fermentation and its importance in Australian table wines.
Rankine, B. C.
Australian Wine, Brewing and Spirit Review 88 (11) 68, 70 & 72 (1970) [En]

Organisms isolated from wines are briefly reviewed, and their cultivation is described. Details of malo-lactic fermentation, usually represented as decarboxylation of L-malic acid to either L or D.lactic acid, with the carboxyl group appearing as CO_2, are explained. The detection of fermentation is by observation of CO_2 evolution, or by demonstration of the absence of malic acid by paper chromatography. Workers in Australia found that $\frac{2}{3}$ of dry red wines and $\frac{1}{2}$ of dry white wines had undergone malo-lactic fermentation during the first 6 months. Leuconostoc occurred in 92% of wines, Lactobacillus in 55% and cocci in 11%. Incidence of fermentation was closely correlated with presence of Leuconostoc and cocci. Incidence depended on the area from which wines were obtained. Studies on induction of malo-lactic fermentation are briefly reported. PEG

3 M 360
[Preparing dough.]
Pokrovskii, A. A.; Pyatnitskaya, I. N.; Patt, V.A.; Shcherbatenko, V.V.; Stolyarova, L. F.; Paskhina, L. A.; Perevenzentseva, V A.
(Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut khlebopekarnoi promyshlennosti)
USSR Patent 2'9 861 (1970) [Ru]

Method involves introducing flour from bean crops, e.g. peas, into the dough ingredients. To improve the quality of the bread, the infusion obtained is maintained for deodorization in a vacuum for 5-7 min at a residual air pressure of 15-20 mm Hg prior to addition to the dough. This is followed by the fermentation of the deodorized infusion by a complex of ferments of lactic acid bacteria, the dough being prepared at 30-32°C with thorough mixing of the ingredients. The infusion of bean flour can be conducted for 15-20 min at 90°C, and the fermentation of the deodorized infusion for 2 -3 h at 50-54°C to an acidity of 9-10°H. W&Co

3 R 118
Microbial flora of Gulf of Mexico and pond shrimp.
Vanderzant, C.; Mroz, E.; Nickelson, R.
Journal of Milk and Food Technology 33 (8) 346-50 (1970) [10 ref. En] [Animal Sci. Dept., A&M Univ., College Station, Texas 77843, USA]

Bacterial counts of shrimp delivered by fishing vessels to processing plants varied greatly. Aerobic plate counts at 28°C ranged from 870 to 1 300 000/g. Either natural sea-water or distilled water could be used in media preparation. The use of artificial seawater usually resulted in lower counts. The microbial flora of Gulf shrimp was dominated by coryneforms and species of Pseudomonas, Moraxella, and Micrococcus. Refrigerated storage usually caused an increase in Pseudomonas species. Bacterial counts of pond shrimp were much lower than those of Gulf shrimp. In some samples of pond shrimp Bacillus and Lactobacillus species were predominant. AS

3 S 214
Bacterial growth in refrigerated, vacuum-packed luncheon meats.
Kempton. A. G.; Bobier, S. R.
Canadian Journal of Microbiology 16 (5) 287-97 (1970) [9 ref. En] [Dept. of Biol., Univ., Waterloo, Ontario, Canada]

The shelf-life of vacuum-packed luncheon meats during refrigerated storage was not related to "total" counts since the only organisms that multiplied in this environment were lactic acid bacteria, which formed only a small proportion of the initial population. Bacterial growth curves obtained from several Canadian products were remarkably similar, but the spoilage patterns differed. For example, wiener spoilage was a function of bacterial growth while bologna spoiled from the accumulation of bacterial end products. After 15 weeks at 5°C, the meats contained 0.6-0.8% lactic acid and the pH of comminuted meats dropped below 5.0. Cooked ham contained much less carbohydrate than comminuted meats, and the pH remained above 6.0. Under these conditions, ham is susceptible to putrefaction although this was not observed during this study. It was found that cooking can eliminate all lactic acid bacteria present in the raw meats but the products become recontaminated during slicing and packaging. The cleaning and sanitizing procedure used by the company that cooperated in this study was efficient, but it was recommended that the packaging room be cleaned more often, and that a selective medium for lactic acid bacteria be used in sanitation surveys. AS

3 S 310
[Relation of changes in microflora and physical and chemical indicators to satisfactory storage time of fresh meat.]
Sutic, M.; Karan-Durdic, S.; Joksimovic, J.
Hrana i Ishrana 10 (11/12) 600-11 (1969) [13 ref. Sh. en]

Beef and buffalo meat were stored at 4-6°C and 10-12°C and the freshness characteristics recorded. No significant differences were found between beef and buffalo meat. Total aerobic microorganisms in meat stored at 4-6°C increased up to 14 days, then remained constant and finally decreased. At 10-12°C max. numbers were attained on the 7th day and then decreased. During initial storage a mixed flora (gram positive and Gram negative bacteria, micrococci, streptococci) was established at both temp. Subsequently Gram negative bacteria became dominant at 4-6°C and finally the sole flora. At 10-12°C the initially dominant Gram negative flora decreased and was replaced by streptococci and micrococci. Values showing closest correlation with organoleptic evaluation were the amino and ammoniacal N (AAN) and volatile fatty acids. As examples, meat stored at 4-6°C became sticky at 55-70 AAN, slimy at 70-120 AAN, and putrid at >120 AAN. IN

3 S 334
Microbiological, sensory and pigment changes of aerobically and anaerobically packaged beef.
Pierson, M. D.; Collins-Thompson, D. L
Ordal, Z. J.
Food Technology 24 (10) 1171-75 (1970) [21 ref. En] [Dept. of Food Sci., Univ., Urbana, Illinois 61801, US]

Fresh top round steaks were packaged in an O_2 permeable film (MSAD 80 cellophane) and an O_2 impermeable film (Capran 77K), and stored at 38°F for 15 days. The bacteriological changes occurring during storage were enumerated by the use of selective plating media. Colour, odour and flavour changes were evaluated. Both the initial and extended storage changes of the meat pigments were determined by reflectance spectrophotometry. The total bacterial count increased much more rapidly and was always higher with aerobic packaging. ~90-95% of the total count in anaerobic packaging were lactobacilli. Fluorescent pseudomonads rapidly increased in number under aerobic conditions while there was no change in numbers under anaerobic conditions. Microbacterium thermosphactum as well as gram negative (oxidase negative) bacteria decreased in number in the anaerobically packaged samples. An initial formation of metmyoglobin with a subsequent reduction to myoglobin was demonstrated in the anaerobically packaged beef. The rate at which the pigments reverted to the myoglobin state, in anaerobic packaging, was decreased as the time between slicing and packaging was increased. The oxymyoglobin of aerobically packaged beef was completely oxidized to metmyoglobin in <5 days of storage. Under anaerobic conditions, myoglobin formed at the surface of the meat within a few hours after packaging and persisted throughout the entire storage period. The sensory evaluation indicated that there was little difference between fresh beef and anaerobically packaged beef for a period of at least 10 days. Aerobically packaged beef was unacceptable after 4 days of storage. AS

4 G 24
[Study on preservation of "Takuanzuke" in sealed polyethylene bags. I. Isolation of microorganisms and their properties.]
Ogawa, T.; Aoki, M.; Kozaki, M.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakfai-shi] 17 (10) 437-42 (1970) Tokyo, Japan]
[14 ref. Ja, en] [Agric. Expt. Sta., Tachikawa,

6 spp. of yeasts and 1 of bacteria were isolated from "Takuanzuke" (pickled radish in a mash of rice bran and salt) contained in a polyethylene film bag in which fermentation was observed. 1 yeast was identified as Hansenula anomala, 2 as Torulopsis sake and the remaining 3 also belonged to the Torulopsis group. The bacteria seemed to be a lactic acid type. Hansenula anomala and Torulopsis sake were not able to grow in 18% brine and the bacteria not in 17% brine. Growth of yeasts was prevented by heat treatment at 55°C for 30 min, 60°C for 20 min, or 65°C for 10 min and of bacteria at 50-55°C for 20 min, or 60°C for 10 min. Sorbic acid was effective as a preservative. HE

4 H 548
[Studies on fermentation control in sake mash. VII. Factors affecting the growth of putrefactive lactic acid bacteria during semicontinuous fermentation of sake mash.]
Hara, S.; Hamatake, A.; Otsuka, K.; Murakami, H.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 64 (4) 379-82 (1969) [7 ref. Ja, en] [Res. Inst. Brewing, Takinogawa, Kita-ku, Tokyo, Japan]

Fermentation of sake mash in a semicontinuous system consisting of 4 fermentation vessels was studied. Because fermentation is carried out in open air, the sake mash is always in danger of contamination by putrefactive lactic acid bacteria. 5 lactic acid beteria (Lctobacillus casei, L. plantarum, 2 strains of L. leichmanii, Leuconostoc mesenteroides) were added to each fermentation vessel to investigate the influence of these bacteria on the sake mash. Growth was markedly inhibited in the 2nd, 3rd and 4th vessels of the system. In the 1st vessel, growth was influenced by pH, alcohol concn. and temp.; at 15°C, it was inhibited by alcohol concn. >5% at pH 3.7, and by 10% alcohol at pH 3.9. The following conditions were necessary to prevent growth in the 1st vessel: pH 3.7-3.8, alcohol concn. 5-8%, temp. 14-15°C, >10^8 yeast cells/g, and a fermentation velocity of 2.5-3.5 g glucose/day/100 ml.

4 H 568
Determination of niacin in orange juice with lyophilized Lactobacillus arabinosus ATCC 8014.
Gorin, N.; Meulenhoff, E. J. S.; Yarrow, D.
Applied Microbiology 20 (4) 641-42 (1970) [4 ref. En] [Food Inspection Service, Centralbureau voor Schimmelcultures, Amsterdam, The Netherlands]

The determination of niacin in orange juice with lyophilized Lactobacillus arabinosus ATCC 8014 has the advantage over the usual method in eliminating the delay caused by the necessity of cultivating cells of L. arabinosus for the inoculum and also eliminating the periodical cultivation on agar slopes. AS

4 H 589
[Lactic acid bacteria from wines and vine leaves.]
Weiller, H. G.; Radler, F.
Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, II. Abteilung 124 (7) 707-32 (1970) [Numerous ref. De, en] [Inst. für Mikrobiol. und Weinforschung, Johannes Gutenberg Univ., Mainz, W. Germany]

58 lactic acid bacteria strains were isolated from 102 wines and 10 strains from leaves of grape vines. Strains were classified by metabolic and growth characteristics which were entered on a punch card classification system. 16 strains were classified as Streptobacteria, 75% of the strains from grape leaves being Lactobacillus plantarum, and 12 strains from wine being L. casei. 8 strains of Betabacteria were classified as L. brevis although they differed in their fermentation patterns. Of 29 isolates of pediococci, 2 strains were Pediococcus pentosaceus and 26 were P. cereviseae. The latter differed among themselves in several physiological characteristics. 30% of the strains of leuconostocs were isolated from grape leaves and were Leuconostoc mesenteroides whilst the other 7 strains from wine were Leuc. oenos. The classification, origin and ecological significance of the strains are discussed BR

5 B 35
[Serological identification of lactic acid bacteria Thermobacterium Orla -Jensen.]
Kvasnikov, E. I.; Nesterenko, O. A.; Kasumova, S. A.; Kachan, A. F.; Kovalenko, N. K.
Mikrobiologiya 39 (4) 654-60 (1970) [8 ref. Ru, en] [Inst. Mikrobiol. i Virusologii imeni D. K. Zabolotnogo, Ukr. SSR, USSR]

Results are given for the identification of 41 strains of bacteria in the sub-genus Thermobacterium Orla - Jensen, obtained from various natural (mainly intestinal) or industrial sources, by precipitation reaction of their HCl extracts with antisera obtained by animal inoculation of strains from culture collections. Identifications were the same as those obtained by examination of morphological and physiological characteristics; the majority of the spp. were Lactobacillus helveticus and L. jugurti BEPC

5 H 737
[Lactic acid bacteria determination.]
Kyowa Hakko Kogyo Co.
Japanese Patent 27 388/70 (1970) [Ja]

Lactic acid bacteria in beer are determined by addition of acetates and mevalonic acid to an anaerobic nutrient medium containing a reducing agent and cycloheximide. IFT

5 H 738
[Comparative tests on disinfectants used in the wine industry.] Vergleichende Untersuchung der in der Weinindustrie angewendeten zeitgemässen Desinfizierungsmittel.
Edelenyi, M.; Sarkany, P.
Mitteilungen: Rebe, Wein, Obstbau und Früchteverwertung 20 (5) 368-74 (1970) [13 ref. De, en, fr, es] [Zentrales Forschungslab. für Oenologie, Budapest, Hungary]

Comparative tests were carried out with commercial disinfectants containing the following groups of active principles: Cl (Ferro-B-chloramine with sodium benzosulphochloramine); I (Iosan and Iosan-S both containing iodophor); quaternary ammonium compounds (Beloran, Diman and ampholytic soaps (Tegonin). Microorganisms used were 3 yeasts (Brettanomyces, Mycoderma vini, Eger 1), 1 mould (Penicillium expansum) and 2 bacteria (Leuconostoc Mesenteroides P 60, Lactobacillus plantarum ATCC 80 014). Effect of the disinfectants was tested after a contact period of 1 or 10 min. Iosan and Iosan-S (0.1 or 0.3 %) had a very good germicidal effect after 1 min, even on P. expansum, which was relatively resistant to the other disinfectants. Crystalline Beloran (0.1 or 0.3 %) showed results after 10 min equal to Iosan or Iosan-S. Tagonin (1%) and Dimanin (0.1%) had little effect after 1 min; after 10 min, Tagonin had a good effect against yeasts and the mould. Ferro-B-chloramine had practically no effect on the yeasts or mould. All the disinfectants were effective against the bacteria. Taste of white wine was not affected after use of disinfectants in concn. of 0.1%; Iosan caused some off-taste. JMS

5 H 774
Natural malo-lactic fermentation in New York State wines.
Rice, A. C.; Mattick, L. R.
American Journal of Enology and Viticulture 21 (3) 145-52 (1970) [15 ref. En] [Res. Dept., Taylor Wine Co., Hammondsport, New York 14840, USA]

Samples of 9 wines taken at weekly intervals following alcoholic fermentation were analysed for lactic, succinic, malic and tartaric acids and glycerol by gas chromatography, and for total reducing sugars, total acid, volatile acid and pH. Development of lactic acid organisms was followed using plate counts on tomato juice-wine agar. Malic acid was converted to lactic acid when the bacterial population reached or exceeded 10^6 cells/ml and the culture was passing from the exponential growth phase to the stationary phase. No increase of lactic or acetic acid was noted during the 2-6 wk period preceding conversion. A stoichiometric relationship was found between malic acid lost and lactic acid produced. Volatile acidity, as acetic acid, increased following conversion. Tartaric acid decreased initially due to a decrease in temp., and later apparently due to an increase in pH following conversion. No changes were observed in succinic acid, glycerol or total reducing sugars. PEG

5 H 775
[Research on L-malic acid degradation by non-proliferating lactic acid bacteria isolated from wines.]
Lafourcade-Lafon, S.
Annales de Technologie Agricole 19 (2) 141-54 (1970) [7 ref. Fr, en, it, es] [Inst. d'OEnologie de Bordeaux, 33-Talence, France]

The degradation of L-malic acid by some lactic acid bacteria (Streptobacterium, Lactobacillus, Pediococcus Leuconostoc) isolated from wine was studied in a synthetic medium free from nitrogenous substances and containing no hydrocarbon source other than L-malic acid. These conditions prevented cell proliferation, and hence activity viz-a-viz the substrate was almost entirely due to the malic enzyme potential which the cells possess. Optimum conditions for L-malic acid degradation were determined in relation to pH (optimum 3.5-4), temp. (30°C), alcohol conen. (11-14°C), SO_2 content (<20 mg/l.) and other factors. The results provide a means of developing a more efficient method for indicing malo-lactic fermentation in wines. HSi

5 H 789
Activity of lactic acid bacteria cultures used in the preparation of mahewu.
Schweigart, F.
Food Industries of South Africa 22 (13) 19-20 (1970) [3 ref. En] [Nat. Food Res. Inst., CSIR, Pretoria, R. of S. Africa]

A culture of thermophilic lactic acid bacteria, derived from Kaffir corn malt, was adapted to maize-meal mash and repeatedly transferred at 12 h intervals to fresh batches of cooked mash. The most rapid souring of the mash, to produce mahewu, was obtained when the mash was inoculated with a 12 h transfer culture using a final incubation period of 8 h. Increasing the incubation period to 20-24 h resulted in slower acid production in the mahewu mash. MEG

5 S 569
The effects of four species of bacteria on some propertieo sf porcine muscle proteins.
Borton, R. J.
Dissertation Abstracts International. Section B. The Sciences and Engineering 30 (12) 5546-47: Order no. 70-9500 (1970) [En] [St. Univ., Ann Arbor Michigan, USA]

Samples of pork longissimus dorsi muscle were found as aseptically as possible (control) and inoculated with Pediococcus cerevisiae, Leuconostoc mesenteroides, Micrococcus luteus or Pseudomonas fragi. Samples were stored at 2 and 10°C and analysed for bacterial growth, protein solubility, pH and emulsifying capacity after 0, 2, 4, 8, 12, 16, and 20 days. In the control samples, organisms found were <10 000/g, and water-soluble protein decreased as salt-soluble protein increased with storage time. The quantity of non-protein N increased with storage time, and was higher in samples stored at 10°C. P. cerevisiae did not grow at 2°C in this study. The pH of the 10 samples decreased with growth of the organism but other properties were not affected. Leuc. mesenteroides grew more slowly at 2 than at 10°C, and the lower temp. culture did not affect protein properties studied. Very low pH values reached in 10°C samples caused an increase in insoluble protein, and reduced emulsifying capacity M. luteus grand grew only at 10°C, and caused increased pH; but protein properti were not affected. P. fragi grew better than the other organisms, but more slowly at 2 than at 10°C. The pH of the samples increased and there was an increase in water-soluble protein. Electrophoretic studies indicated that the type of protein had been altered. The emulsifying capacity of these samples increased for 8 days and then decreased, but but was still greater than that of controls. MJB

6 H 872
[The microbiology of wine. 7th Assembly of the working group "Microbiology of wines" Paris, 22 April 1970.]
Anon.
Bulletin de l'Office International du Vin 43 (473-74) 799-824 (1970) [Fr]

This report of discussions at the Assembly covers the following: methods (1969-70) for detecting antiseptics in wine by biological means: the natural fermentability of wines; lactic acid bacteria in wine (taxonomic classification); foundation of a catalogue of strains; methods used for determination of lactic acid bacteria; industrial testing of the use of lactic acid bacteria in wines; methods for biological control of wines; and fortification of wines with vitamins by microbiological methods. JMS

6 H 874
[Differentiation of live and dead micro-organisms in wine by fluorescence microscopy.]
Bur'yan, N. I.; Rabinovich, Z. D.; Shubin, S. G.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Vinodeliya i Vinogradarstva 'Magarach' 17: 126-35 (1970) [11 ref. Ru, fr] [Vses. Nauchno-issled. Inst. Vinodeliya i Vinogradarstva Magarach', USSR]

(i) Saccharomyces vini strain Feodosiya 1-19 and pure cultures of (ii) lactic acid and (iii) acetic acid bacteria were respectively grown in must, cabbage medium and a medium consisting of must, dry wine and water (1:1:1 proportions). Cultures of different ages and different physiological conditions were examined before and after exposure to heat, SO_2 or sorbic acid. For examination, 1 drop of a culture was mixed with 1 drop of a 1:20 000 aqueous solution of Primulin and examined in a fluorescence microscope. Results discussion are: harvesting, transport and pressing of grapes; addition of SO_2; preparation of must heating, use of bentonite and SO_2 for clarification; fermentation (yeasts, influence of temp. during fermentation on chemical composition of wine; malolactic fermentation); and racking and clarification (addition of SO_2 and gelantin, "blue" clarification). JMS

6 J 750
Growth promoting activity of an aqueous extract of soybean seeds for some microorganisms.
Nakagaki, T.; Hirano, S.
Agricultural and Biological Chemistry 34 (10) 1580-83 (1970) [12 ref. En] [Central Res. Lab., Nippon Rakuno Kyodo Co., Ltd., Oda, Izumishi, Osaka, Japan]

An aqueous extract of soybean seeds, showing growth promoting activity for Lactobacillus acidophilus (ATCC 11506), L. acidophilus L-54 and Lactobacillus bulgarius B-1 was shown to contain free adenine, guanosine and L-tryptophan. Cytidine, L-arginine and trigonelline were also present but had no significant activity. RM

6 L 468
[Process for producing pure, crystalline maltose powder.] Verfahren zur Herstellung von hochreinem kristallinen Maltosepulver.
Kurimoto, M.; Sugimoto, K.; Hirao, M. (Hayashibara Co.)
West German Patent Application 1 958 014 (1970) [De]

A 10-40% starch slurry (e.g. potato, cereal, tapioca starch, etc.) is converted at 160°C to a dextrose equivalent of 1-5, in the presence of an enzyme or an acid. The slurry is saccharified with β-amylase and α-1,6-glucosidase. Cooling is rapid to the required value for each step. Suitable α-1,6-glucosidase are enzyme strains prepared from Escherichia, Pseudomonas, Lactovacillus, Micrococcus, Nocardia and Aerobacter. The obtained sugar solution is purified, condensed by vaporization, and spray-dried to 70-80% concn. The product is for fermentation processes, food production, etc. W&Co

6 M 665
[Use of by-products of dairy industry in breadmaking.]
Kreen, M. I.; Libert, T. L.; Kask, K. A.
Tallinna Polütehnitise Instituudi Toimetised, Seria A 1969 (273) 49-57 (1969) [5 ref. Ru, de]

Addition of 21% (by wt.) concn. skim-milk to wheat flour improved the odour and taste of the finished bread, but reduced the vol. and porosity. Further addition of 8-12% of preparation obtained from skim-milk or 4-4.5% food hydrolysate AU-1, obtained by cultivation of Aspergillus oryzae and lactic acid bacteria in skim-milk and preferably freeze-dried, accelerated dough fermentation, improved taste and odour of the bread, and retarded ageing. HBr

6 M 729
[The quality of gluten.]
Ozimkova, S. N.; Ostrovskii, A. I.; Enikeeva, N. G.; Dekshitskaya, S. Z.
Khlebopekarnaya i Konditerskaya Promyshlennost' 14 (7) 20-21 (1970) [Ru] [Moskovskii Tekhnologicheskii Inst. Pishchevoi Promyshlennosti, USSR]

The influence on the quality and quantity of gluten in wheat flour was studied with mixes incorporating maize, soya flour and separated dried milk, inoculated with lactic acid bacteria. Soya flour and separated dried milk considerably increased the nutritive value of bread. Of all the investigated substances formed during fermentation, lactic acid had the most advantageous effect on gluten. Tables with quality indices of samples of flour, admixtures and gluten used are included. STI

6 S 687
Bacterial contamination of processed poultry.
Patterson, J. T.
British Poultry Science 10 (1) 89-93 (1969) [4 ref. En] [Ministry of Agric. for N. Ireland, Belfast, UK]

Samples of cooled uneviscerated, cooled eviscerated and frozen eviscerated carcasses from 6 processing plants were microbiologically examined [Br. Poult. Sci. (1968) 9: 129-33]. 83% of uneviscerated carcasses had total bacterial counts of $<250\,000/cm^2$ of breast skin, against 65.4 and 64.7% for cooled and frozen eviscerated carcasses respectively. >90% of uneviscerated and frozen eviscerated carcasses had coli-aerogenes counts of <1000/16 cm^2, but this applied to only 59.6% of cooled eviscerated carcasses. 79.8, 92.4 and 93.0% of cooled eviscerated, cooled uneviscerated and frozen eviscerated carcasses respectively had <10 000 faecal streptococci/16 cm^2. 66.8% of all carcasses carried <100 Staphylococcus aureus/16 cm^2. None of the regression or correlation coeff. for the uneviscerated carcasses were significant; for the cooled eviscerated (all plants) and frozen eviscerated carcasses (plant F) both the coli-aerogenes and faecal streptococcal counts were significantly correlated. PEG

6 S 721
[Bacteriology of spit-roasted chicken.]
Pambianco, L.
Atti della Societa Italiana delle Scienze Veterinarie 23: 830-33 (1969) [5 ref. It, en, fr] [Istituto di Patologia Generale ed Anatomia Patologica Vet., Univ., Turin, Italy].

Bacteriological tests were performed on 25 spit-roasted chickens obtained from various shops in Turin. Samples studied were: a rinse of the inner wall of the abdominal cavity; pectoral muscle; leg muscle; and skin from the anal region; these were tested for aerobic mesophiles, total enterobacteria, Escherichia coli, faecal streptococci, pathogenic staphylococci, sulphite, reducing clostridia and salmonellae. Results are tabulated. The low counts obtained indicated good hygienic quality. AB

6 T 304
Presence of antioxidant materials in bacteria.
Smith, J. L.; Alford, J. A.
Lipids 5 (10) 795-99 (1970) [16 ref. En] [E. Util. Res. and Development Div., Agric. Res. Service, USDA, Beltsville, Maryland 20705, USA]

Non-enzymic antioxidant materials were obtained from washed cells of 14 species of bacteria by extraction with methanol for 24 h, evaporation to dryness, extraction with benzene. Antioxidant activity was recorded as a prolongation of the period required for the initiation of rancidity as measured by changes in the peroxide value of lard used in the test systems. The methanol soluble-benzene soluble fractions of Bacillus cereus, Lactobacillus dextranicum, Micrococcus freudenreichii and Sarcina lutea and the methanol soluble-benzene insoluble fractions of 3 Pseudomonas spp. showed considerable activity. In all cases the primary effect was typical of known antioxidants and extended the 'induction period' rather than decreasing the rate of oxidation. Extracts from Pseudomonas ovalis were the most active, 25 mg/15 g lard extended the shelf life beyond 20 days. On a wt. basis, the bacterial fractions were not as active as butylated hydroxyanisole, butylated hydroxytoluene or tocopherol. However, a true comparison cannot be made until the bacterial extracts have been further purified. LTH

7 B 52
[Streptococcus - a study of its structure, biochemistry, culture and classification.]
Streptococcus - eine Studie zur Strukture, Biochemie, Kultur und Klassifizierung.
Hahn, G.; Heeschen, W.; Tolle, A.
Kieler Milchwirtschaftliche Forschungsberichte 22 (4) 333-548 (1970) [1361 ref. De, en, fr] [Bundesanstalt für Milchforschung, Kiel, W. Germany]

This paper discusses the structure and biochemical function (particularly of the cell wall constituents) and enzymatic activities of members of the genus Streptococcus, the biological criteria of the different serological types (groups A to U) and untyped species, and the biochemical bases for their importance in medicine, food hygiene and technology. Over a period of 5 years, 20 508 Streptococcus strains, comprising 7980 from humans, 778 from animals and 11 750 from milk, have been studied at the streptococci centre at the Institute of Hygiene of the Federal Dairy Research Centre at Kiel. CDA

7 B 59
Lactic acid bacteria associated with raw plant food material.
Mundt, J. O.
Journal of Milk and Food Technology 33 (12) 550-53 (1970) [3 ref. En] [Dept. of Food Tech., Univ., Knotville, Tennessee 37916, USA]

The lactic acid group of bacteria occur on plants with some degree of constancy, but not of consistency, and seldom at high levels of population. Their role on the surface of plants is unknown, and apparently passive, for no functional concrete role in an intimate bacterium to plant relationship has been detected. AS

7 E 371
[Process for preserving food products.] Verfahren zur Konservierung von Lebensmittelprodukten.
Tuynenburg, M. G. (Unilever NV)
Wset German Patent Application 1 816 168 (1970) [De]

See also FSTA (1970) 2 5P652.

7 H 983
Homofermentative lactobacilli of ciders including Lactobacillus mali nov. spec.
Carr, J. G ; Davies, P. A.
Journal of Applied Bacteriology 33 (4) 768-74 (1970) [15 ref. En] [Long Ashton Res. Sta., Univ., Bristol, UK]

This paper describes some homofermentative lactobacilli, found in freshly pressed apple juice, which can be divided into 2 groups. One of these consists of strains identified as Lactobacillus plantarum, of which nearly all can metabolize quinic acid. The other group, which consists mainly of catalase-positive bacteria, is composed of strains alike enough to be grouped together but sufficiently different from other lactobacilli to be proposed as Lactobacillus mali nov. spec. AS

7 R 303
[Microbiology of edible molluscs on sale in Naples.]
Capurco, A., Rania, U., Esposito, L. d'; Izzi, R.
Atti della Societa Italiana delle Scienze Veterinarie 23: 780-84 (1969) [It, fr, en]
[Stazione Sperimentale Zooprofilattica del Mezzogiorno, Portici, Italy]
Results are given of bacteriological examination of edible molluscs on sale in Naples, originating from breeding grounds along the Neapolitan coast, other localities of Italy, and Spain and Tunisia. It the course of 2 yr 123 samples, each consisting of 10 specimens, were collected from the public market. Homogenized samples were tested for total bacteria, total enterobacteria, salmonellae, Escherichia coli, sulphite-reducing anaerobes, staphylococci and faecal streptococci. Faecal pollution was indicated by counts of 5 million bacteria/g homogenate and the presence of faecal streptococci, sulphite-reducing anaerobes, staphylococci and in 2 samples, Salmonella ljubliana, and the resultant danger to consumers is discussed. AB

7 S 760
Fermented meat product.
Rothchild, H.; Olsen, R. H. (Dairy Technics Inc.)
United States Patent 3 561 977 (1971) [En]
The patent covers a process in which a frozen, stabilized bacterial product, consisting of Pediococcus cerevisiae mixed with a stabilizing agent such as glycerol, is mixed with a meat formulation and held at 110-125°F for 15 h. IFT

7 S 775
[Studies on changes in coppa (salted pork).]
Cantoni, C.; Bianchi, M. A.; Renon, P.; Calcinardi, C.
Atti della Societa Italiana delle Scienze Veterinarie 23: 752-56 (1969) [1 ref. It, fr, en]
[Istituto di Ispezione degli alimenti di origine animale, Univ., Milan, Italy]
Chemical and bacteriological changes associated with deterioration were studied in 7 samples of normal and spoiled coppa. Volatile fatty acids in the spoiled product increased from 11.1 to 18.5 g/100 g, chiefly butyric, isobutyric and isovaleric, carbonyl compounds from 0.78 to 0.92 mg %, chiefly acrolein, isovaleraldehyde, diacetyl, caproaldehyde, crotonaldehyde. Methyl mercaptan was present in all spoiled samples. The normal microbial flora of micrococci and lactobacilli was augmented by streptococci, corynebacteria and Arthrobacter. RM

7 S 813
Microflora of fresh pork sausage casings. II. Natural casings.
Riha, W. E.; Solberg, M.
Journal of Food Science 35 (6) 860-63 (1970) [11 ref. En] [Dept. of Food Sci., Rutgers - St. Univ., New Brunswick, New Jersey 08903, USA]
Aerobic total plate counts on tryptone glucose extract agar at 28°C varied from a level >30 000 to 59 000 000 microorganisms/g in salt-packed natural casings and from 180 000 to 23 000 000 organisms/g in wet-packed natural casings. Both salt-packed and wet-packed casings supported similar growth patterns in selective media. 38 isolates were identified from the salt-packed casings and 53 from the wet-packed. Of the salt-packed isolates, 60.5% were of the genus Bacillus, 7.9% Pseudonomas, 15.8% Clostridium, 1.6% Micrococcus and 5.3% Gaffyka. Those isolates obtained from the wet-packed casings included 62.3% Bacillus, 7.5% Pseudomonas, 7.5% Clostridium, 7.5% Micrococcus, 5.6% Proteus, 1.9% Lactobacillus and 5.7% unidentified. [See FSTA (1971) 3 3S298 for part I.] AS

7 S 855
[Microbiological study of fresh raw sausages on sale in Sassari.]
Pisanu, S.
Atti della Societa Italiana delle Scienze Veterinarie 24: 511-12 (1970) [It, fr, en]
[Istituto di Isperezione degli Alimenti di Origine Animale, Univ., Sassari, Italy]
16 samples of fresh raw sausage were analysed by the method of Castagnoli & Tiecco [Guida all'esame microbiologico degli alimenti di origine animale (1963): Istituto Superiore de Sanita, Rome]. Total bacterial counts ranged from 5×10^1 to 5×10^{10}/g; enterobacteria, present in all samples, ranged from 5×10^1 to 5×10^5/g; titres of faecal streptococci, present in all samples, ranged from 5×10^{-2} to 5×10^{-4}; no salmonellae or sulphite-reducing clostridia were present. HBr

7 S 860
The influence of lactic cultures on ground beef quality.
Reddy, S. G.; Henrickson, R. L.; Olson, H. C.
Journal of Food Science 35 (6) 787-91 (1970) [22 ref. En] [Agric. Axpt. Sta., Stillwater, Oklahoma 74074, USA]

Effect of adding 5 and 10% lactic cultures (Streptococcus lactis and Leuconostoc citrovorum) grown in skim-milk; 2.5, 5, 10 and 20% lactic cultures grown in 20% milk solids; 1 and 2% frozen conc. lactic cultures; lactic acid to pH 5.0 and 4.5; and 2.5, 5 and 10% skim-milk; to ground beef stored at 7°C were studied. Results were used to formulate the principal investigation.
Influence of 10% lactic culture and 10% lactic culture plus 450 ppm ascorbic acid was tested in 5 replicate trials for the principal investigation. Cultures used in the replicate trials were grown in 20% milk solids. CVT (crystal violet tetrazolium) counts for gram-negative bacteriam pH, VNC (volatile N content), and organoleptic observations were evaluated. Data from the preliminary study indicated profound inhibitory action of lactic cultures on growth of inherent gram-negative bacteria in ground beef. Addition of 10% lactic culture grown in 20% milk solids was effective in preventing aerobic growth.
Addition of pure lactic acid inhibited microbial growth, but caused undesirable colour and aroma. Frozen conc. cultures required 1% lactose to inhibit growth. CVT count in uncultured meat (i) significantly increased ($P < 0.01$) as storage time progressed. Cultured meat (ii) did not exhibit a significant increase in CVT count until 7 days of storage. pH of (ii) significantly declined ($P < 0.01$) whereas (i) indicated a significant increase in pH ($P < 0.01$) during storage. VNC in (i) was significantly higher ($P < 0.01$) than in (ii). (ii) with 450 ppm ascorbic acid was consistently preferred for flavour, aroma, and when colour was compared with (i) and (ii). AS

8 H 1098
Spoilage organisms in breweries.
Rainbow, C.
Process Biochemistry 6 (4) 15-17 & 31 (1971) [23 ref. En]

The main spoilage organisms in beer, which is a poor medium for microbial growth, are lactobacilli, including L. pastorianus, L. brevis and Pediococcus cerevisiae, Acetobacter spp., Acetomonas spp., Zymomonas anaerobia and yeasts. The metabolism of all these organisms in beer is discussed, together with possible methods for their control. It is concluded that while it may be possible to reduce spoilage by a reduction in residual nutrients in beer, this will never take the place of strict hygienic control. WHCA

8 H 1128
[Effect of pH of medium on enzyme activity of submersion cultures of Aspergillus batatae-61.]
Lazareva, A. N.; Ustinnikov, B. A.; Pykhova, S.
Fermentnaya i Spirtovaya Promyshlennost' 36 (8) 15 (1970) [6 ref. Ru]

A potential danger in the continuous fermentation of amylaceous raw materials for alcohol production is acidification by lactic acid bacteria. H_2SO_4 effectively inhibits the lactic acid bacteria, but also has an inactivating effect on saccharifying enzymes. Expt. were therefore carried out with submersion culture of Aspergillus batatae; these proved satisfactory since the amylolytic enzymes were stable at an acidity of 0.45-0.5° Dornic and pH 4.4-4.5. The culture was grown in filtrates of distiller's grains with 2% wheat flour and 0.2% magnesite at pH 5.9. STI

8 H 1141
The drying of lactic acid bacteria cultures for mahewu production.
Schweigart, F.
Lebensmittel-Wissenschaft und Technologie 4 (1) 23 (1971) [14 ref. En] [Nat. Food Res. Inst., Pretoria, R. of S. Africa]

3 methods for dehydrating mahewu starter cult. (mainly Lactobacillus delbrueckii) were investigated: freeze drying, spray drying and oven drying. It was established that dried cultures were less active than normal wet cultures, and that dried powders could be prepared if the cultures were partially neutralized with $CaCO_3$ before drying. The pH optima found were: for freeze drying, 4.6-4.8; for spray drying, 5.1-5.3; and for oven drying, 4.9-5.2. Cultures dehydrated by freeze or spray drying were superior to those dried in an oven at 45-50°C. The dried cultures were readily reactivated by serial transfer to fresh medium. The powders were satisfactory for use as inoculants for souring of mahewu gruels. AS

8 H 1145
[Use of membrane filters for microbiological control of syrups.]
Svorcova, L.
Prumysl Potravin 22 (1) 16-18 (1971) [7 ref. Cs]

The direct inoculation technique was unsuitable for control of microbiological compositions of syrup used for sweetening soft drinks, because with conc. syrups microbial growth was inhibited, while with dilute syrups only gross contamination could be demonstrated. A membrane filtration technique involving subsequent incubation of the membrane on suitable selective media proved successful for determination of total bacteria, coliform, Leuconostoc spp. and mould and yeast counts. A direct microscopic technique on dilute centrifuged syrup also proved satisfactory for yeast determination. OA

8 H 1183
[Experiences with different media for the detection of beer spoilage bacteria (pediococci and lactobacilli) in brewer's yeast.] Erfahrungen beim Nachweis von bierschädlichen Bakterien (Pediokokken und Laktobazillen) in Brauerei-Betriebshefen mit verschiedenen Nährböden.
Mändl, B.; Seidel, H.
Brauwissenschaft 24 (4) 105-09 (1971) [17 ref. De, en, fr] [St. Brautech. Prüf- und Versuchsanstalt, Weihenstephan, W. Germany]

The following liquid and solid or semisolid media were compared for routine control of brewer's yeast: (i) wort + ammonia (pH 6.5); (ii) unhopped beer; (iii) slightly hopped beer; (iv) VLG-S7-agar [see Mschr. Brauerei (1969) 22 (1) 8-11]; (v) VLB-L41-agar [see Mschr. Brauerei (1969) 22 (1) 3-8]; (vi) Nakagawa medium [see following abstr. and FSTA (1971) 3 2H128]; and (vii) pasteurized commercial beer. Media (i)-(vi) were fairly equal from the viewpoint of detection of contaminating bacteria, while (vii) was unsatisfactory. (ii) and (iii) gave higher counts than (i) but were less specific. Advantages and disadvantages of liquid and solid media are discussed. AS

8 H 1204
[Bacteria in the soft drinks industry.] Zur Bakterien-Flora von Erfrischungsgetränken. [A review]
Sand, F. E. M. J.
Brauwelt 111 (15) 252-64 (1971) [70 ref. De, en, fr] [Mikrobiol. Abteilung, Naarden, Naarden-Bussum, The Netherlands]

The subject is reviewed under the following headings: different bacterial groups (covering effect of test method, effect of disinfectant and sterilizing agent, Gram-positive bacteria, Gram-negative bacteria); media for determining the bacterial flora of soft drinks (covering determination of total count, determination of lactic acid bacteria); interpretation of test results (covering quantitative evaluation, qualitative sginificance of different bacterial species); origin of the bacteria (covering water, sugar, concentrates, other raw materials, bacterial proliferation in machines and pipelines, packaging and bottling, personnel, air infection). HBr

8 S 879
[Using bacterial cultures in brining pork joints.]
Mikhailova, A.
Myasnaya Industriya SSSR 41 (8) 19-20 (1970) [8 ref. Ru] [Vses. Nauchno-issled. Inst. Myasnoi Promyshlennosti, USSR]

The aroma and flavour of hams depends not only on the quantity of microorganisms but also on the accumulation of their metabolites. The quantity of metabolites can be increased by pre-cultivating the microorganisms in broth containing 1% salt, 0.1-0.2% water-soluble native proteins, 0.9-1.2% minerals and other essential substances at 20-25°C for 3-5 days. After pre-cultivation 16% of salt, 0.07% of nitrite and 0.5% of sugar are added to the broth. The broth is injected into the meat; the chemical composition of the curing solution is the same but it contains no microorganisms. Microbial cultures used for these purposes are Streptococcus lactis, St. lactis (strain H) and Lactobacillus plantarum (strain M.) STI

8 S 940
Influence of controlled microbial curing on porcine muscle.
Bothast, R. J.; Graham, P. P.; Kelly, R. F.
Journal of Food Science 36 (3) 450-53 (1971) [24 ref. En] [Dept. of Food Sci. & Tech., Polytech. Inst., Blacksburg, Virginia 24061, USA]

A previous developed technique was adapted to study the influence of certain microbiological populations and their effects on processed meat. The technique consisted of an initial reduction of surface bacteria on conventionally handled muscle tissue via a hot water dip, followed by processing at 28°C in a sterile plastics isolator where Pediococcus cerevisiae was introduced into the curing solution. This treatment was compared to reduced initial count and conventional samples. Identification of bacteria in the curing solution of each treatment indicated that a Lactobacillus sp. was predominant in the reduced initial count treatment. The inoculated P. cerevisiae was predominant in the reduced initial count inoculated treatment while Staphylococcus epidermidis and Flavobacterium diffusum were predominant in the conventional treatment depending upon the trial. Tenderness and bacterial load were signifciantly ($P<0.01$) increased by treatment while pH was significantly ($P<0.01$) decreased. Oxidation and muscle composition were not effected by treatment. Samples from all treatments were acceptable organoleptically. AS

8 S 942
Effect of microbial growth upon sarcoplasmic and urea-soluble proteins from muscle.
Hasegawa, T.; Pearson, A. M.; Price, J. F.; Rampton, J. H.; Lechowich, R. V.
Journal of Food Science 35 (6) 720-24 (1970) [15 ref. En] [Dept. of Food Sci., St. Univ., East Lansing, Michigan 48823, USA]

A comparison of starch gel patterns of sarcoplasmic proteins from aseptic and inoculated porcine and rabbit muscles after storage for 0, 8 and 20 days at 10°C indicated that different microorganisms preferentially utilized specific proteins. Pseudomonas fragi showed the greatest amount of proteolytic activity upon the sarcoplasmic fraction, causing extensive breakdown in both rabbit and porcine muscle. Leuconostoc mesenteroides caused extensive alteration in the sarcoplasmic proteins of rabbit muscle, but had less effect upon porcine muscle. Pediococcus cerevisiae exhibited similar action to Leuc. mesenteroides upon rabbit muscle sarcoplasmic proteins, but had no effect upon pig muscle. Micrococcus luteus showed only minor breakdown of rabbit muscle sarcoplasmic proteins, and had no action upon porcine muscle. Both Ps. fragi and P. cerevisiae caused considerable breakdown of the urea-soluble proteins in pig muscle and to a lesser extent in rabbit muscle. Neither M. luteus nor Leuc. mesenteroides exerted any measurable proteolytic effect upon the urea-soluble proteins. Possible implications concerning meat spoilage are discussed. AS

8 S 943
[Studies of the microflora of prepacked sliced sausages.] Untersuchungen zur Mikroflora von vorverpackten, aufgeschnittenen Brüh- und Kochwürsten.
Reuter, G.
Archiv für Lebensmittelhygiene 21 (12) 257-63 (1970) [20 ref. De, en] [Inst. für Lebensmittelhygiene, Freien Univ., Berlin, W. Germany]

Bacteriological examinations were made of 27 samples of vacuum-packed sliced cooked sausages and bologna sausages, followed by detailed examination of 8 manufactured batches stored at 4-6°, 10° and 20°C. and sampled at intervals up to 29 days. At 4-6°C Lactobaccilli grew well but extensvie growth of the proteolytic flora was inhibited. At 10° and 20°C the major flora comprised Enterobacteria, Micrococci, Enterococci and Lactobacilli; Bacillus and Pseudomonas spp. were not important and sulphite-reducing Clostridia disappeared. Egg yolk positive Staphylococci were 10^2/g. Numbers reached in some samples included Enterococci 10^7/g. Enterobacteria 10^7 - 10^8/g and Lactobacilli 10^8 -10^9/g. Organoleptic tasting tests showed poor correlation with microbiological results. Contamination by Enterobacteria is attributed to slicing and packing operations and slow cooling. ELC

8 S 962
[Lactobacilli and closely related microorganisms in meat products. I. Occurrence and significance (survey of literature). II. Characterization of isolated lactobacilli strains.] Laktobazillen und eng verwandte Mikroorganismen in Fleisch und Fleischerzeugnissen. I. Vorkommen und Bedeutung (Literaturübersicht.) II. Die Charakterisierung der isolierten Laktobazillenstämme. [A review]
Reuter, G.
Fleischwirtschaft 50 (7) 951-62 (1970) [100 ref. De, en, fr] [Bitterstrasse 8-12, 1000 Berlin 33, Germany]

After an introductory survey of the occurrence of lactobacilli and related microorganisms in raw and processed meat and meat products, a microbiological study was made. A representative selection of isolated strains was identified by morphological, physiological and biochemical criteria which should provide a basis for identification by research workers without special knowledge of lactobacilli. Most new strains were grouped as streptobacteria, characterized in the main by 3 criteria: a tendency towards coccoid cells on medianormal or low in carbohydrates, lower acid tolerance and lower growth-temp. minima than typical lactobacilli. Also some new "typical" streptobacteria were found of similar type to L. casei and L. plantarum. It is felt that 2 strains should be elevated to the rank of species, owing to the constancy of their distinguishing characteristics and their frequent occurrence. L. farciminis nov. and L. alimentarius nov. spec. are suggested as names for the new species. 3 other strains, which have so far only been isolated in a few cases hould be regarded as new biotypes. Within the subgenus Betabacterium 2 strains of the species L. viridescens were distinguished, one of which was like L. brevis and the other more like the Leuconostoc species. L. viridescens sp. halotolerans was suggested as the new sub-species. All the new strains were tested for metabolic activity. They were also examined for their ability for form nitratase, peroxide, dextran, acetone, and ammonia. FWJ

9 G 346
[Fermented protein foods.]
Zaidan Hojin Shokuryo Kenkyukai
Japanese Patent 6819/71 (1971) [Ja]

Aqueous solution of egg white and milk or casein is heated at pH 5.5-6.0 to precipitate the protein. Edible oils or fats are added, and the composition emulsified. Lactic acid bacteria starter is then added and the composition allowed to ferment. IFT

9 H 1263
The effects of grape must pressing treatments on some factors of importance to the stimulation of induced malo-lactic fermentation.
Beelman, R. B.
Dissertation Abstracts International. Section B. The Sciences and Engineering 31 (4) 2041: Order no. 70-19292 (1970) [En] [St. Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

Musts prepared by cold pressing, hot pressing and fermentation "on the skins" for 1, 3 and 5 days before pressing were inoculated with Leuconostoc citrovorum (ML34). Complete malo-lactic fermentation occurred after 11.3 wk in the must fermented 5 days "on the skins" and ~50% of the malic acid was fermented, before bacterial activity ceased, in the must fermented 3 days "on the skins". The remaining musts supported only limited growth of the inoculated bacteria. Chemical analyses and the preparation of model grape musts were undertaken in an attempt to identify the factors which stimulated induced malo lactic fermentation. DFM

9 H 1273
[Fermented beverages.]
Aisawa, K.
Japanese Patent 260/71 (1971) [Ja]

Lactic acid bacteria are grown in glucose-enriched oiled extract of potato; further glucose is added when the bacterial growth comes to a steady state. IFT

9 H 1388
A study of wild yeast and lactic acid bacteria in the brewery.
Brenner, M. W.; Hsu, W. P.
Technical Quarterly, Master Brewers Association of America 8 (1) 45-51 (1971) [7 ref. En, es] [Schwarz Services Int. Ltd., Mount Vernon, New York, USA]

Wild yeasts in beers were detected using the Schwarz Differential Medium, and lactic acid bacteria using the Nakagawa Medium consisting of yeast extract, casein hydrolysate, glucose, acetate, minerals, a reducing agent, actidione, and agar. Contamination by wild yeasts of >100 wild cells/million cells occurred in 14% of the samples, consisting of 81% Saccharomyces, 8% Candida, 3% Hansenula, and 8% unidentified spp. Investigations into effect of wild yeasts on beer are reported. >50% of beers were free of lactic acid bacteria. Lactobacilli were much more prevalent in unfinished beers than pediococci. PEG

9 H 1399
[Characteristics of lactic acid bacteria isolated from Georgian wines and other sources.]
Gogoberidze, R. G.
Trudy Gruzinskogo Nauchno-Issledovatel'skogo Instituta Pishchevoi Promyshlennosti 4: 102-13 (1971) [23 ref. Ru]

Of 240 strains of lactic acid bacteria isolated from >2400 samples of Georgian wines and materials in contact with the wines (e.g. equipment), 18 strains, of the heterofermentative type, could not be identified. Lactobacillus brevis, L. buchneri and L. cellobiosus were the dominant species; L. plantarum was the only homofermentative type isolated; 18 of the 22 streptococcal strains isolated were Leuconostoc mesenteroides, and only 4 of these were from the wines. HBr

9 J 1158
Studies on the antimicrobial activity of olive phenolic compounds.
Juven, B.; Henis, Y.
Journal of Applied Bacteriology 33 (4) 721-32 (1970) [25 ref. En] [Volcani Inst. of Agric. Res., Rehovot, Israel]

Treatment of green olives for 2 min with dil. hot alkali before brining increased the release of sugar, B complex vitamins, amino acids and phenolic compounds, and enhanced the establishment of lactic acid bacteria in the brine. 2 components of the ethyl acetate extract of green olives, which showed an antibacterial activity, were isolated and identified as the glycoside oleuropein and its phenolic aglycone. The inhibition of Lactobacillus plantarum by the ethyl acetate extract or by oleuropein was augmented by reducing the concn. of organic N compounds, increasing the NaCl concn. in the assay medium and decreasing the inoculum size. Besides its activity towards various bacteria, oleuropein inhibited the growth of Geotrichum candidum Link, Rhizopus sp. and Rhizoctonia solani Kuhn. On the basis of these findings, an explanation for some problems in the lactic fermentation of green olives is suggested. AS

9 M 1009
[Baked compositions.]
Ezaki Glico Co. Ltd.
Japanese Patent 32 905/70 (1970) [Ja]

Portions of cake dough are dried and coated before baking with aqueous compositions containing lactic acid bacilli along with mono- or polysaccharides, polyalcohols, and flavouring agents. IFT

9 M 1054
Studies on sourdough Lactobacillus species.
Nelson, L. S.; Srinanganathan, N.; Duryee, F. L.; Seidler, R. J.; Sandine, W. E.; Elliker, P. R.
Bacteriological Proceedings 1971: 4 (1971) [En] [Dept. of Microbiol., St. Univ., Corvallis, Oregon, USA]

Lactobacilli isolated from sourdough bread starter obtained in the San Francisco Bay area failed to ferment any of 26 carbohydrates tested except maltose, apparently due to their evolution in high gluten starters were maltose is liberated by yeast action. 4 independent isolates were found to be non-motile, catalase negative, Gram-positive rods. Electron microscopy revealed that the organisms (0.5-0.7 μm × 1-3.5 μm) were structurally similar to other lactobacilli and other Gram positive bacteria and possessed 1-3 large mesozomes at the site of cell division or cell terminus; nearly all cells revealed structural anomalies at the membrane-wall interface. Thermal melting data yield M% guanine plus cytosine values ranging from 36.0 to 38.0 suggesting a relationship to Lactobacillus acidophilus, L. helveticus, L. jugurti and L. salivarius. These sourdough lactobacilli failed to hydrolyse the maltose chromogen p-nitrophenyl-α-D-glucopyranoside, indicating maltose metabolism does not involve an α-glucosidase. AS

9 S 1085
[Veterinary and sanitary control and technological processing of animal products.] Veterinarno-sanitarnaya ekspertiza itekhnologiya pererabotki produktov zhivotnovodstva. [A book]
Zagaevskii, I. S.; Zhernovskii, F. A.
2nd revised edition 247pp. (1970) [Ru] Moscow, USSR: Izdatel'stvo 'Kolos' Price 0.62 rouble

This textbook, intended primarily for use in veterinary and sanitary departments of agricultural technical colleges, contains the following chapters: Factors influencing meat production of animals (pp. 5-14); Transport of animals and products with short shelf-life (15-25); Slaughterhouse and meat processing plants (26-41); Preparing animals and poultry for slaughter (42-45); Technology of primary processing of animals and poultry (46-56); Meat (covers morphology, chemistry, nutritive value, ripening, decay, classification) (57-77); Post mortem veterinary and sanitary examination of organs and carcasses (78-89); Veterinary and sanitary control and evaluation of products from sick animals (90-126); Food poisoning and toxins (salmonellae, botulism, staphylococci, streptococci, Escherichia coli) (127-42); Technology and hygiene of preservation of meat and meat products (low- and high-temp. preservation, sausages, salting, smoking) (143-62); Processing and veterinary and sanitary control of slaughter products (fats, offal, blood) (163-75); Processing and veterinary and sanitary control of raw materials of animal origin (skins, hides, wool, hair) (176-87); Milk, milking conditions and sanitary evaluation (188-203); Manufacture of sour milk products (204-07); Fundamentals of butter- and cheesemaking (208-15); Veterinary and sanitary control of retail fish (216-26); Sanitary evaluation of retail vegetable products and honey (227-36); and Veterinary and sanitary control of retail meat and milk (237-45). HBr

9 S 1114
Effects of four species of bacteria on porcine muscle. I. Protein solubility and emulsifying capacity.
Barton R. J.; Bratzler, L. J.; Price, J. F.
Journal of Food Science 35 (6) 779-82 (1970) [19 ref. En] [Dept. of Food Sci., St. Univ., East Lansing, Michigan 48823, USA]

Aseptic porcine muscle was inoculated with (i) Pediococcus cerevisiae, (ii) Micrococcus luteus, (iii) Leuconostoc mesenteroides and (iv) Pseudomonas fragi and compared with aseptic controls during 20 days storage at 2 and 10°C. All organisms grew at 10, but only (iv) and (iii) at 2°C. Solubilities of protein fractions were affected by inoculation. This was exemplified by correlation coeff. of -0.37 to +0.50. Coeff. indicated the interrelationship affected by storage conditions and bacterial growth. Protein solubility studies revealed a loss in water-soluble fraction during storage of controls and (ii)- and (iii)-treated samples. Samples with (iv) evidenced initial loss, followed by an increase. Solubility of meat proteins in salt solution increased during the first 8 days, then decreased or remained relatively constant for all samples. In comparison with controls, samples with (iv) increased in salt-soluble protein solubility during the first 8 days, whereas those with (iii) decreased during the latter part of storage. Insoluble protein increased except for (iv)-inoculated samples, which decreased. Nonprotein nitrogen (NPN) increased for all treatments and controls over 20-days. NPN extracted from samples inoculated with (iv) increased greatly. pH increased with growth of (ii) and (iv) and decreased with growth of (i) and (iii). Emulsifying capacity was not influenced by growth of (ii) or (i); emulsifying capacity of samples inoculated with (iii) decreased, that of samples inoculated with (iv) increased. AS

9 S 1115
Effects of four species of bacteria on porcine muscle. II. Electrophoretic patterns of extracts of salt-soluble protein.
Borton, R. J.; Bratzler, L. J.; Price, J. F.
Journal of Food Science 35 (6) 783-86 (1970) [5 ref. En]

Electrophoresis of 0.6 M KCl extracts of porcine longissimus dorsi muscle revealed little change in the type or number of protein bands found either by starch-urea or disc-urea gel electrophoresis. The 0.6 M KCl extracts of muscle samples inoculated with Pediococcus cerevisiae, Leuconostoc mesenteroides and Micrococcus luteus and stored at 2 and 10°C for 20 days did not differ electrophoretically from control samples. Extracts of samples inoculated with Pseudomonas fragi showed a loss in the number of protein bands on starch-urea gel and disc-urea gel electrophoresis, indicating this organism exhibited some proteolytic effect upon the myofibrillar proteins. AS

9 S 1180
[Effect of liquid smoke preparations on development of lactic acid bacteria.]
Kunizhev, S. M.
Trudy, Vologodskii Molochnyi Institut 60: 25-31 (1970) [8 ref. Ru] [Vologodskii Molochnyi Inst., Vologda, USSR]

Starters, composed mainly of lactic acid bacteria, are used in smoked sausage manufacture for ripening sausage meat. Experiments were carried out to assess the inhibitory effects of liquid smoke preparations on development of lactic acid bacteria. 5 strains of Streptococcus lactis, 4 of Str. diacetilactis, 4 of Str. paracitrovorus and 2 of Str. cremoris were grown singly in a solid hydrolysed milk agar in the presence of 0-7.5% of (i) a liquid smoke preparation issued by the All-Union Meat Industry Research Institute or of 0-2.5% (ii) a 1:7 dilution of a preparation issued by the Moscow Institute of National Economy. Str. cremoris strains were the most resistant; (ii) was much more inhibitory than (i) and prevented all growth at a concn. of 2.5%. A dried starter composed of the spp. listed above and issued by the All-Union Butter and Cheese Industry Research Institute was added at 5% to sterile skim-milk in the presence of 0.1, 0.5 or 1% of (i) or without it. Milk coagulation and acid formation at 32°C were little affected even by the highest concn. of (i). It is recommended to use mixed starters for smoked sausage and test them for susceptibility to inhibition by liquid smoke. SKK

9 T 445
[Studies on halotolerant lactic acid bacteria as related to brewing of soy sauce. I. Isolation and taxonomic studies of Tetracoccus sp.]
Sugimori, T.; Jose, H.
Journal of Fermentation Technology [Hakko Kogaku Zasshi] 48 (4) 218-27 (1970) [18 ref. Ja] [Kyoto Res. Lab., Marukin Shoyu Co. Ltd., Uji-shi, Kyoto fu, Japan]

Halotolerant lactic acid bacteria were isolated from both soy koji and soy mash. Among bacteria isolated, a tetrad from bacterium related closely to Tetracoccus soyae was considered the most important for brewing of soy sauce. Tetracoccus No 100 (i) was a halotolerant facultative anaerobe, appearing mostly in either tetrad or diploid form. Gram-positive, non-motile, non-spore-forming and catalase-positive, (i) was found to reduce nitrate and to ferment salicine and glycerol but not galactose. Biotin and nicotinic acid were essential for the growth of (i). Distribution of (i) during the brewing of soy mash is outlined. HK

9 T 482
Microbiological spoilage of mayonnaise and salad dressings.
Kurtman, C. P.; Rogers, R. F.; Hesseltine, C. W.
Bacteriological Proceedings 1971: 3 (1971) [En] [N. Regional Res. Lab., Peoria, Illinois 61604, USA]

Saccharomyces bailii was isolated from 13 of 17 samples of spoiled mayonnaise and salad dressing. Most of the remainder were spoiled by Lactobacillus fructivorans, but one contained large numbers of both Sacch. bailii and L. plantarum. 2 of the spoiled samples also had small numbers of bacilli. Bacillus subtilis, B. pumilis, B. polymyxa, B. megaterium, and B. licheniformis occurred in 1 sample and B. subtilis and B. pumilis in another. Small numbers of B. subtilis and B. licheniformis were also present in 1 unspoiled sample. Several media were evaluated for isolation of L. fructivorans. Sacch. bailli and L. fructivorans vigorously fermented glucose. The concn. of glucose in spoiled samples ranged from 0 to 38.5 g/kg and from 1.3 to 17.8 g/kg in unspoiled samples. AS

10 B 99
Plate count agar versus Letheen agar in bacteriological plate count of cooling water with high pH in continuous can sterilizers.
Lunder, T. L.
Milchwissenschaft 26 (1) 18-19 (1971) [11 ref. En, de, fr] [Res. Lab., Nestle Products, Vevey, Switzerland]

Letheen, a commercial plate count agar containing lecithin and Tween 80; [see Quisno at al., Soap Sanit. Chemicals (1947) 23 (6) 145-51], is recommended for estimation of the bacteriological quality of cooling water used in continuous can sterilizers. The Tween 80 in the medium stimulates the growth of certain bacteria, including lactobacilli which are the main contaminants of cooling water. CDA

10 H 1441
[Biological bottling store control in the brewery.]
Eine biologische Flaschenkellerkontrolle in der Brauerei.
Hoffmann, S.
Brauwelt 111 (25) 491-496 (1971) [41 ref. De, fr]
[Zentrallaboratorium der Dortmunder Union-Brauerei AG, Dortmund, W. Germany]

A biological control method used for some time in the bottling store of a W. German brewery is described. Wort agar is used for determination of yeasts, VLB-L-41 agar for lactobacilli and VLB-S7 agar for pediococci. The beer is sampled and analysed before the filler, in the filler and in the bottles, and other analyses are made of the filler, crown corks, corker, environmental air, pressurized air, washed bottles and the bottle washing machine. The various organisms are identified by growth on selective media and microscopically. TUB-IGB

10 H 1454
Control of malo-lactic fermentation in wine.
Tchelistcheff, A.; Peterson, R. G.:
Gelderen, M. van
American Journal of Enology and Viticulture 22 (1) 1-5 (1971) [3 ref. En] [Beaulieu Vineyard, Rutherford, California 94573, USA]

Addition of fumaric acid to Pinot Noir, Pinot Chardonnay and Gamay Beaujolais wines was found to inhibit malo-lactic fermentation by Leuconostoc citrovorum ML-34. Disappearance of malic acid, an indicator of malo-lactic fermentation, was detected by paper chromatography. Gallic acid in amounts up to 400 ppm was ineffective in the presence of 120 ppm fumaric acid, but some synergistic action seemed to occur at higher levels. Small, ineffective amounts of fumaric acid disappeared during malo-lactic fermentation. The action of fumaric acid could not be explained. PEG

10 H 1517
The effect of grape skin treatments on induced malo-lactic fermentation in Ohio wines.
Bedman, R. B.; Gallander, J. F.
American Journal of Enology and Viticulture 21 (4) 193-200 (1970) [17 ref. En] [Dept. of Horticulture, St. Univ., Columbus, Ohio 43210, USA]

Induced malo-lactic fermentation was attempted in grape musts prepared by cold pressing, hot pressing, and fermentation "on the skins" for 1, 3 and 5 days before pressing. The musts were inoculated with the malo-lactic bacterium Leuconostoc citrovorum (ML 34) and otherwise treated by a standard vinification procedure. Results revealed that fermentation "on the skins" had a profound effect on the occurrence and rate of malo-lactic fermentation. The grape musts prepared by cold pressing, hot pressing, and fermentation "on the skins" for 1 day supported only limited growth of the inoculated bacteria, and no malo-lactic fermentation was detected after 1 yr. The wines that were fermented "on the skins" for 3 days underwent an incomplete malo-lactic fermentation. Wines that were fermented for 5 days "on the skins" completed malo-lactic fermentation by 11.3 wk after the bacterial inoculation. In addition, model grape musts were prepared which simulated the grape musts prepared by hot and cold pressing as well as fermentation "on the skins". Isolates prepared from these model musts were demonstrated to contain substances stimulatory to the growth of Leuc. citrovorum. Microbiological assays indicated that the isolates from the skins caused a greater growth stimulation than the isolates from the model musts simulating hot and cold-pressed musts. AS

10 H 1556
[Studies on hiochi bacteria. II. Characteristics.]
Momose, H.; Yamagishi, T.; Nosiro, K.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 65 (9) 799-803 (1970) [17 ref. Ja, en]

69 strains of hiochi bacteria were examined, with Lactobacillus heterohiochi H-1, L. japonicus H-7 and L. fermenti H-74 as the reference strains. The bacteria were classified into 4 groups: (i) heterofermentative genuine hiochi bacteria, (ii) homofermentative genuine hiochi bacteria, (iii) heterofermentative hiochi-type lactobacilli, and (iv) homofermentative hiochi-type lactobacilli. 44 of the strains belonged to (i), 14 to (ii), 5 to (iii) and 5 to (iv). A homofermentative strain, S-35, seemed to exhibit intermediate characteristics, growing well in sake and requiring mevalonic acid for growth, but also growing well in nutrient broth with glucose. (i) showed strong assimilation of glucose and fructose, and produced DL-lactic acid; (ii) assimilated only glucose and mannose, and produced DL- or DL + L-lactic acid. Strain S-35 assimilated glucose, sucrose and mannose. YN

10 S 1226
[Hard salami with starter cultures.] Rohwurst mit Starterkulturen.
Coretti, K.
Fleischerei 21 (5) 26 & 28 (1970) [De, fr, en, it, es] [Bundesanstalt für Fleischforschung, Kulmbach, W. Germany]

Production of hard salami with starter cultures is increasing because of acceleration of reddening, stabilization, favourable effect on development of texture by a rapid and pronounced reduction of pH, aroma improvement and reduction of processing time. Micrococcus strains and lactic acid bacteria which are used singly or in combination, are non-pathogenic and naturally occurring in meats. By their use incidental environmental contamination resulting in quality loss can also be prevented. OA

10 S 1255
Influence of lactic cultures on microbial deterioration in ground beef.
Reddy, S. G.
Dissertation Abstracts International. Section B. The Sciences and Engineering 31 (8) 4766: Order no. 70-21466 (1971) [En] [St. Univ., Stillwater, Oklahoma 74074, USA]

The use of lactic acid bacteria to retard bacterail deteroration of ground beef was investigated. Cultures of Streptococcus lactis and Leuconostoc citrovorum grown under various conditions were used. 10% culture grown in reconstituted skim-milk prevented growth of indigenous Gram-negative bacteria and reduced the increase in other spoilage parameters. Lactic acid alone prevented microbial growth but caused undesirable colour and aroma changes. The addition of 450 ppm ascorbic acid to lactic cultures improved flavour, aroma and colour of the meats. AHV

11 H 1669
[Use of sulphone as an antimicrobial agent during production of alcohol from molasses.]
Alieva-Vitukevich, E. R.
Fermentnaya i Spirtovaya Promyshlennost' 37 (1) 23-24 (1971) [4 ref. Ru] [Ukrainskii NIISP, USSR]

Of the agents commonly used to suppress undesired lactic acid bacteria in alcohol production, chloride of lime is weak and formalin inactivates the yeast enzymes. Use of sulphanole dodecylbenzene sulphonate, a synthetic, surface-active agent derived from the propane-propylene fraction of crude oil, was proposed for molasses mash and tested. As a mixture of sodium salts of alkylbenzene sulphonic acids, sodium sulphate and non-sulphuretted organic compounds, it is slightly toxic, having an LD_{50} of 2.3 g/kg wt. in animal tests. It does not have a cummulative effect. Tests with preparations of various origin showed that the degree of antimicrobial effect depends on the branching of the alkyl chain. It may be applied in a concn. of 30-56 g/ton molasses and its effect is greater in an acid environment. STI

11 H 1702
[Studies on hiochi bacteria. V. Mevalonic acid requirement and classification of Bacillus saprogenes.]
Momose, H.; Noshiro, K.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 66 (3) 271-274 (1971) [21 ref. Ja, en] [Res. Inst. Brewing, Takinogawa, Kita-ku, Tokyo, Japan]

Hiochi bacteria in sake were classified by mevalonic acid requirement for growth. Heterofermentative hiochi bacteria were classified into 2 groups: one essentially required mevalonic acid for growth, and has been designated as genuine hiochi bacteria, the other did not require mevalonic acid and was designated as hiochi-type lactobacilli [See FSTA (1971) 3 10H1555-8]. The mevalonic acid requirement of homofermentative hiochi bacteria ranged from high to nil. It was proposed that homofermentative hiochi bacteria should be classified into 3 groups: genuine hiochi bacteria, hiochi type lactobaclli and an intermediate group, on the basis of pH growth range, effects of alcohol on growth, and assimilation of sugars regardless of mevalonic acid requirement. YN

11 H 1729
[Fermented soya bean beverage.]
Morinaga Confectionery Co. Ltd.
Japanese Patent 10 030/71 (1971) [Ja]

An aqueous rice-bran extract is combined with exoleated soya bean powder and fermented with a lactic acid bacillus. IFT

11 L 901
[Results of microbiological control of heavy juice during storage.]
Priimak, V. M.; Mishina, V. K.; Donets, A. I.
Sakharnaya Promyshlennost' 44 (8) 25-27 (1970) [Ru] [KNIIPP, USSR]

Experimental storage of heavy juice in special metal tanks (498 m^3 vol.) was performed in the sugar factory of Korenovks during the 1968/69 campaign. The method used to assure sterile environment and the actual storing method are described. Heavy juice was stored from Dec. to June. The total count of thermophilic bacteria did not exceed 150/100 g saccharose in the heavy juice, and the count of lactic acid bacteria and slime forming bacteria did not exceed 200. It was shown that under working conditions the heavy juice after concn. did not contain yeasts, thermophilic bacteria and lactic acid bacteria nor lime-forming bacteria (including Leuconostoc).

11 P 1824
[Reduction of the decolorization time in the methylene blue reduction test by adding co-enzymes. II. Studies on raw milk, aseptically drawn raw milk and sterilized milk with added bacterial cultures.] Über die Verkürzung der Entfärbungszeit bei der Methylenblau-Reduktionsprobe durch Zusatz von Coenzymen. II. Untersuchungen mit Rohmilch, aseptic gewonnener Rohmilch und Sterilmilch unter Zusatz von Bakterienkulturen.
Rapp, M.
Milchwissenschaft 26 (2) 94-97 (1971) [11 ref. De, en] [St. Milchwirtschaftliche Lehr- und Forschungsanstalt, Wangen im Allgäu, W. Germany]
Methylene blue reduction time (MBRT) was reduced by addition of ATP or NAD+ to raw milk and aseptically drawn milk but not when added to sterilized milk. When various bacterial strains were added to aseptically-drawn milk per se, or containing 0.196 mg APT/ml or 0.435 mg NAD+ /ml respectively, MBRT were: (i) with 12 million Streptococcus lactis/ml, 236, 218 and 212 min; (ii) with 1 million Str. cremoris/ml, 24 h, 253, and 256 min; (iii) with 8 million Escherichia coli/ml, 180, 116 and 121 min; and (iv) with <10 bacteria/ml, 24 h, 343 and 320 min. In similarly inoculated non-sterile raw milk (initial count ~10^6/ml), MBRT showed a similar pattern but with slightly shorter MBRT. In sterilized milk, MBRT were (i) 190, (ii) 283, (iii) 330 min and (iv) >24 h and addition of ATP or NAD+ had no further effect on MBRT. It is suggested that the coenzymes act by accelerating lactose fermentation in the raw milk [for part I, see FSTA (1971) 3 8P1345] and that the mechanism involves attachment of the coenzyme to a heat-labile substance in the milk; this mechanism would therefore be blocked in sterilized milk. CDA

11 P 1836
Effect of malathion and trichlorphon on growth and morphology of lactic culture organisms.
Deane, D. D.; Patten, M. M. van
Journal of Milk and Food Technology 34 (1) 16-22 (1971) [18 ref. En] [Animal Sci. Div., Univ., Laramie, Wyoming 82070, USA]
Addition of 100 ppm of the pesticides malathion or trichlorphon to 10% reconstituted dried skim-milk had little effect on rate of acid production by Streptococcus diacetilactis or Str. thermophilus B, although acid production was slower with a 1% than a 10% inoculum, particularly of Str. diacetilactis. After repeated transfer in litmus milk containing 100 ppm malathion or 500 ppm trichlorphon, cells of Str. cremoris 3, Str. lactis W8 and several strains of Str. thermophilus tended to become smaller, whereas those of Lactobacillus bulgaricus A showed an increase in chain frequency; cell structures 30 to >50 μm in length were observed in L. bulgaricus strains A and GA after 30 transfers. L. casei strains B, C, ATCC 334 and ATCC 393 showed no consistent morphological changes, but L. casei A showed increased chain length of up to 30 μm with indistinct septae after 15-20 transfers and also structures 50-100 μm in length with few visible septae; the effect, which was less pronounced with 500 ppm trichlorphon than with 100 ppm malathion, was not permanent, cells reverting to normal after 4-5 transfers in pesticide-free litmus milk. CDA

11 P 1846
[Fermented milk beverage.]
Kagiwada, K.
Japanese Patent 10 031/71 (1971) [Ja]
Process is described for the production of fermented milk beverages, employing fermentation with various Lactobacillus acidophilus strains. IFT

11 P 1848
[Dairy products.]
Eurorga SA
French Patent 1 567 121 (1969) [Fr]
Substances with growth factors for lactobacilli, including bificus bacteria, are prepared preferably by hydrolyzing milk with pepsin at pH 1.5-4.0 for 3 h at a temp. of 45°C, inactivating the enzyme by heating at 100°C for 25 min, filtering and drying. The substance is particularly suitable for the manufacture of cultured products for infants and is incorporated into the milk before incubation or after the coagulation at a rate of 0.3-3 g/125-ml container. FI.

11 P 1853
[Selection of lactic streptococci for cream cultures.]
Bannikova, L. A.; Mytnik, L. G.
Molochnaya Promyshlennost' 32 (4) 18-21 (1971) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]
995 strains of mesophilic lactic streptococci, including 42 strains of Streptococcus cremoris, were isolated from 78 samples of smetana, farm raw milk and field and garden flowers by subculturing 2 or 3 × in sterilized skim-milk followed by holding at 25°C; enriched cultures were plated on hydrolysed milk agar and held for 2 days at 25°C and then at room temp. Colonies were inoculated into skim-milk and clotting time, fermentative and proteolytic activities, bacteriophage resistance and other characteristics were determined. Of the 42 strains of Str. cremoris, 6 were discarded because of inadequate formation of acid; 24 of the remaining 36 strains were identified by cultural and biochemical tests as typical Str. cremoris. All 36 strains were resistant to polyvalent streptococcal bacteriophage, formed acid vigorously and produced in milk smetana consistency and typical cream taste; they are recommended for factory use. SKK

11 P 1870
Growth of Leuconostoc citrovorum in skim-milk fortified with an extract of Streptococcus lactis cells.
Goel, M. C.; Marth, E. H.
Journal of Dairy Science 54 (4) 472-477 (1971) [25 ref. En] [Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

2 strains of Leuc. citrovorum (CAF-B and Da3) producing long chain and 2 producing short chains (9 and 14) were examined periodically during incubation for 30 h at 22 and 30°C in skim-milk fortified with 0, 0.25 or 0.5 mg protein/ml from a cell-free extract of Str. lactis. Both protein concn. and both incubation temp. had similar enhancing effects on growth of all 4 strains; CAF-B, 9 and 14 were enhanced to a greater extent than was strain Da3, but in most cases populations in fortified skim-milk exceeded those in normal skim-milk by ⩾1 log cycle. Generation times were reduced by both levels of protein at both temp.; the higher protein level caused the greater reduction at 22°C while the reverse was true at 30° C. Longer chains were formed in fortified than in plain skim-milk, with the exception of CAF-B in the presence of 0.5 mg protein. Strain Da3 produced longer chains at 22°C than at 30°C, and strains 9 and 14 produced the longer chains at 30° C. Protein extract enhanced acid production by all 4 strains in skim-milk, coagulation occuring after 14-18 h at 30° C or 18-22 h at 22°C. [see also FSTA (1970) 2 5P669 & 5P670.] CDA

11 P 1871
Growth of Leuconostoc citrovorum in skim-milk w.... and without additives.
Goel, M. C.
Dissertation Abstracts International. Section B. The Sciences and Engineering 31 (11) 6675: Order no. 70-24745 (1971) [En] [Univ., Madison 6, Wisconsin, USA]

See preceding abstr.

11 P 1896
[Method for culturing lactic acid streptococci capable of producing a bitter taste in cheese.]
Klimovskii, I. I.; Zvyagintsev, V. I.; Gudkov, A. V.; Medvedeva, Z. P. (Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 291 958 (1971) [Ru]

Prior to cultivation, 2.5 ml of a sterile rennet solution mixed with chalk are added per 100 ml milk. The solution is prepared by mixing 0.7 g rennet powder with 25 ml aqueousglycerine solution at a ratio of 1:1, followed by keeping the mixture for 24 h at 5°C and filtering through a sterile Zeitz filter. Cultivation is carried out for 6 days. W&Co

11 P 1914
The design and operation of a continuous milk fermentation system.
Linklater, P. M.; Griffin, C. J.
Australian Journal of Dairy Technology 26 (1) 22-26 (1971) [12 ref. En] [Food Tech. Dept., Univ., Kensington 2033, NSW, Australia]

A laboratory scale continuous fermentation plant is described which has run continuously for some 18 wk. The fermentation of sterilized reconstituted skim-milk by Streptococcus lactis C10 was controlled by a pH controller, which continuously monitored the pH and drew off the product on reaching the required pH. The product drawn off was replaced with milk from a balance tank, itself supplied from a reservoir in which the milk was deoxygenated by a stream of CO_2 and N_2. JHP

11 P 1928
[Study of starters in the manufacture of Suluguni cheese.]
Lomsadze, R. N.; Demurishvili, L. I.
Molochnaya Promyshlennost' 32 (6) 20-22 (1971) [6 ref. Ru] [Tbilisskoe Otdelenie Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Tbilisi, USSR]

Suluguni cheeses were made in parallel from a common batch of milk pasteurized at 71-72°C and cooled to 32°C using (i) 1% of an experimental starter composed of 4 strains of Streptococcus thermophilus and 3 of Lactobacillus bulgaricus, or (ii) 1% of the industrial small-cheese starter. Coagulum ripening under whey (to pH 5.2-5.3) was at 35-37° C with (i) and at 30-32°C with (ii). Thereafter the procedure prescribed by the Georgian SSR republican technical specifications was followed with both types of cheese. Values for pH, titratable acidity, contents of fat, salt, and total, protein and non-protein N and total bacterial counts of freshly made cheeses and cheeses aged 2, 5, 10 and 15 days are tabulated as well as values for contents of 17 free amino acids in 2-day old cheeses (total contents with (i) and (ii) respectively, 29.1 and 20.5 mg/100 g). Starter (i) shortened coagulum ripening by 30-50 min by intensifying lactic acid formation, and improved taste and consistency of cheese; its use in commercial production of Suluguni cheese is recommended. SKK

1 P 1931
Abstracts of papers to be presented at the Sixty-Sixth Annual Meeting, Michigan State University, East Lansing, June 20-23, 1971. Manufacturing section. Bacteriology.
United States of America, Dairy Science Association
Journal of Dairy Science 54 (5) 748-750 (1971)
[En]
The following papers are included in this ection: Isolation of an antibiotic from Lactobacillus bulgaricus, by G. V. Reddy & K. M. Shahani (M1); Staphylococcal enterotoxin A development in Cheddar cheese slurries, by N. R. Gandhi & G. H. Richardson (M2); Chemical mutation of Streptococcus lactis, by D. C. Westhoff (M3); Plating medium pH as a factor in apparent survival of sublethally stressed yeasts, by F. E. Nelson (M4); Growth of salmonellae in skim-milk fortified with antibiotics, by H. S. Park & E. H. Marth (M5); Aflatoxin produced experimentally in brick cheese, by C. N. Shih & E. H. Marth (M6); Effect of 3 insecticides on morphology of Lactobacillus bulgaricus, by D. D. Deane & R. A. Jenkins (M7); Growth and heat resistance of Bacillus stearothermophilus ATCC 7953 in infant formulas, by E. M. Mikolajcik, D. B. Chawan & A. A. Quraishi (M8); Inactivation of Salmonella typhimurium by sorbic acid, by H. S. Park & E. H. Marth (M9); and Assay of the heat-inactivation of immunoglobulins in milk systems, by E. M. Mikolajcik & D. P. Sinha (M10). CDA

11 P 1934
Abstracts of papers to be presented at the Sixty-Sixth Annual Meeting, Michigan State University, East Lansing, June 20-23, 1971. Manufacturing Section. Bacteriology.
United States of America, Dairy Science Association
Journal of Dairy Science 54 (5) 754-756 (1971)
[En]
The following papers are included in this section: Effect of heptachlor, chlordane and related compounds on the growth of Staphylococcus aureus, by B. E. Langlois & K. G. Sides (M28); Growth and sporulation of psychrophilic bacilli, by T. E. Shehata & E. B. Collins (M29); Recovery of airborne coliforms on various media, by A. K. Stersky & T. I. Hedrick (M30); Component balance in mixed lactic cultures when subjected to normal preservation procedures, by M. S. Reddy, E. R. Vedamuthu & G. W. Reinbold (M31); Effect of an organochlorine pesticide on bacteria producing lactic acid, by W. E. Hantke & R. L. Bradley, Jr. (M32); Influence of pH on inhibition of Staphylococcus aureus by Streptococcus diacetilactis, by C. Dally, W. E. Sandine & P. R. Elliker (M33); Automation of pour-plate preparation, by J. G. Bradshaw, D. W. Francis & R. B. Read, Jr. (M34); Preparation and storage of lactic starter concentrates, by J. W. Blaine, W. E. Sandine & P. R. Elliker (M35); Interrelationship of adsorption, tolerance to quaternary ammonium compounds, and some cell wall characteristics of Escherichia coli, by N. P. Tiwari & R. B. Maxcy (M36); and Effect of pasteurization on growth response of psychrotrophs, by R. Y. Cannon (M37). CDA

11 P 1937
Abstracts of papers to be presented at the Sixty-Sixth Annual Meeting, Michigan State University, East Lansing, June 20-23, 1971. Manufacturing section. Chemistry.
United States of America, Dairy Science Association
Journal of Dairy Science 54 (5) 760-762 (1971)
[En]
The following papers are included in this section: Chemical changes from ultra-high temperature processing of milk, by S. D. Senter & W. K. Stone (M57); Effect of storage at 4 °C on the fat globule membrane, by M. A. Anderson, G. C. Cheeseman & W. F. Shipe (M58); Sampling technique for gas chromatographic analysis of volatile components from food lipids, by R. G. Arnold (M59); Lipid composition of milk as influenced by whey products in the ration, by R. C. Peper, J. G. Parsons & D. J. Schingoethe (M60); Determination of carboxymethylcellulose with chromotropic acid, by H. D. Graham (M61); Rigid polyurethane foam extended with partially delactosed whey, by G. O. Hustad, T. Richardson & C. H. Amundson (M62); Enzymatic hydrolysis of lactose in dairy foods, by L. F. Hood (M63); Lactic streptococcal agglutinin in milk, by C. Kanno, D. B. Emmons & M. Kalab (M64); and Influence of copper and tocopherol on the susceptibility of herd milk to spontaneous oxidized flavour, by J. C. Bruhn & A. A. Franke (M65). CDA

11 P 1957
[Sensitivity to bacteriophage of local strains of lactic streptococci.]

Lomsadze, R. N.; Ediberidze, E. G.
Trudy, Gruzinskii Nauchno-Issledovatel'skii Institut Pishchevoi Promyshlennosti 4: 333-336 (1971) [12 ref. Ru] [Gruzinskii Nauchno-issled. Inst. Pishchevoi Promyshlennosti, USSR]
7 of 32 strains of Streptococcus lactis and 2 of 7 strains of Str. cremoris isolated from Georgian SSR market cultured milk products were found to be sensitive to ⩾1 of 5 strains of bacteriophage (1 from the All-Union Dairy Industry Research Institute and 4 from local bulk milk). Use of multi-strain starters composed of bacteriophage-resistant lactic streptococci is recommended for cultured milk production in the Goergian SSR. SKK

11 P 1958
[Characteristics of lactic streptococci isolated from Georgian SSR milk products.]
Gogoberidze, R. G.; Lomsadze, R. N.; Kargareteli, M. Sh.; Sardzhveladze, E. S.
Trudy, Gruzinskii Nauchno-Issledovatel'skii Institut Pishchevoi Promyshlennosti 4: 336-341 (1971) [16 ref. Ru] [Gruzinskii Nauchno-issled. Inst. Pishchevoi Promyshlennosti, USSR]
811 strains of lactic acid bacteria were isolated from 170 samples of Georgian SSR milk, matsun, smetana, tvorog, cheese and butter. 228 of the strains coagulated milk and 56 (24.6%) of these strains (comprising 30 Streptococcus lactis, 8 Str. cremoris, 2 Str. paracitrovorus, 8 unidentified streptococci and 8 lactobacilli) were found to possess desirable starter properties. SKK

11 P 1974
[Properties of streptococci isolated from starters used in Ceylon for the preparation of fermented milk products.]
Kulatunga, R. A.
Mikrobiologiya 39 (6) 1067-1072 (1970) [22 ref. Ru, en] [Moskovskii Gosudarstvennyi Univ. imeni M. V. Lomonosova, USSR]
20 strains of lactic streptococci were isolated from 2 starter cultures commonly used for fermented milk products in Ceylon. Optimum growth temp. were 37-42°C. All strains fermented glucose, lactose, mannose, sucrose and fructose, and weakly fermented raffinose and dextrin; galactose and maltose were assimilated by a few strains. 15 strains fermented carbohydrates to lactic acid only, whereas 5 strains also produced small amounts of acetoin, diacetyl and volatile acids. The strains resembled Streptococcus thermophilus in carbohydrate fermentation and temp. relations. Studies on the vitamin requirements of 5 strains showed that riboflavine, pantothenic acid and nicotinic acid were essential for growth, biotin and pyridoxin had a stimulatory effect on all strains, and thiamine and p-aminobenzoic acid stimulated growth of 2 strains; folic acid and vitamin B_{12} had no perceptible effect on the growth of the bacteria. AS

11 P 1975
[Methods for prolonging the shelf-life of yoghurt.] Verfahren zur Haltbarkeitsverlängerung von Joghurt.
Klupsch, H. J.
Deutsche Milchwirtschaft 22 (7) 297-300 (1971) [15 ref. De]
The use of pasteurization of yoghurt after incubation, the filling with CO_2 of the head-space in containers of yoghurt, and the use of special starters, as measures for increasing the storage, life, are discussed. A comparison with ordinary yoghurt showed that after 4-wk storage a 5-8°C, a special yoghurt 'Biogarde' made using a starter containing Lactobacillus acidophilus starter containing Lactobacillus acidophilus and L. bifidus instead of L. bulgaricus had a completely satisfactory flavour, whilst ordinary yoghurt was bitter and excessively sour. A manufacturing procedure for this yoghurt includin the use of CO_2 is outlined. It is claimed that CO_2 treatment extends the storage life of the yoghurt, made with the exclusion of contamination with moulds and yeasts, by ~25%. A method for the manufacture of pasteurized fruit yoghurt filled with the application of CO_2 is also outlined. The storage life at 15°C is ⩾4 wk; the microflora is destroyed. FL

11 P 1991
Preparation of an elastic cheese product.
Kasik, R. L.; Luksas, A. J. (Beatrice Foods Co.)
United States Patent 3 579 354 (1971) [En]
In one example of the invention, whose objective is the preparation of a bland sodium caseinate free from objectionable flavours, a sterile aqueous dispersion containing 10% sodium caseinate and 5% butterfat, is inoculated with Str. lactis and incubated at 32°C for 24 h without aeration. The mixture is then inoculated with Micrococcus caseolyticus and incubated at 32°C for 3 days under conditions of aeration and agitation. The mixture, which becomes plastic and elastic in texture, is then acidified with lactic acid to pH 4.5, and the liquid expelled to yield a Mozzarella cheese-like product containing 8% moisture. EJM

12 A 559
[Results of comparative determinations of riboflavin in the COMECON countries.] Ergebnisse einer Riboflavinvergleichsanalyse innerhalb der RGW-Länder.
Cerna, J.; Pickova, J.
Nahrung 15 (1) 95-101 (1971) [9 ref. De, en, ru]
[Forschungsinst. für die Lebensmittelind., Akad. d. Landwirtschaft, Prague, Czechoslovakia]
The authors report on 2 comparative riboflavin determinations in which 13 instituties in COMECON countries participated. A fluorescence method, 2 modifications of the lumiflavin method and a microbiological method using Lactobacillus casei and 2 different culture media were examined. The results were statistically tabulated. The microbiological method yielded the most consistent results, and is to be officially standardized for COMECON countries. IN

12 B 122
[Diagnosis of Streptococcus agalactiae using TKT medium and the CAMP test with the application of Columbia agar basic medium.] Zur Diagnose von Galtstreptokokken im TKT-Medium und CAMP-Test unter Verwendung des Columbia-Agar-Grundsubstrats
Zaadhof, K. J.; Terplan, G.
Archiv für Lebensmittelhygiene 22 (5) 114-115 (1971) [4 ref. De, en] [Inst. für Milchkunde, Tierarztliche Hochschule, Hanover, W. Germany]

The use of Columbia agar base (2.3% special peptone, 0.1% starch, 0.5% NaCl and 1% agar) instead of nutrient agar in the preparation of TKT medium and in the CAMP test for diagnosis of Str. agalactiae improves both the groth of the organism and the distinctness of the haemolysis zone it produces. Some experience in interpreting the results of these tests is required as the colonies do not assume the same form, as on the usual blood agar. GTP

12 B 123
A differential broth for separating the lactic streptococci.
Reddy, M. S.; Vedamuthu, E. R.; Rheinbold, G. W.
Journal of Milk and Food Technology 34 (1) 43-45 (1971) [7 ref. En] [Dept. of Food Tech., St. Univ., Ames, Iowa 5000. USA]

A broth medium incorporating lactose (as milk), arginine, sodium citrate and a pH indicator (bromocresol purple) is described, which permits the differentiation of 3 spp. of lactic streptococci, namely Streptococcus cremoris, Str. lactis and Str. diacetilactis, on the basis of acid, ammonia and CO_2 production. By the use of this medium, a total of 40 strains of these species were differentiated from each other and from strains such as Leuconostoc dextranicum and Leuc. citrovorum. MJL

12 B 133
Filamentous forms of Streptococcus cremoris and Streptococcus lactis. Observations on structure and susceptibility to lysis.
McDonald, I. J.
Canadian Journal of Microbiology 17 (7) 897-902 (1971) [30 ref. En] [Div. of Biol., Nat. Res. Council of Canada, Ottawa, Canada]

12 J 1435
[Typical flora of spoiled canned tomatoes. Thermal death times.]
Hernandez, E.; Feria, M. A.
Revista de Agroquimica y Tecnologia de Alimentos 11 (1) 126-131 (1971) [12 ref. Es, de, en, fr] [Inst. de Agroquimica y Tecnologia de Alimentos, Valencia, Spain]

The microbial flora responsible for the main types of spoilage in canned tomatoes was studied. Spoiled samples were collected from canning plants throughout Spain over a period of 2 yr. The following microorganisms were identified: Lactobacillus casei, L. plantarum and L. delbrukei, Saccharomyces cerevisiae, Debaromyces sp.; Aerobacter sp., and spore-forming anaerobes Bacillus subtilis, B. thermoacidurans and B. stearothermophilus. The butyric anaerobes Cl. butyricum and Cl. pasteurianum, producers of large quantities of gases, gave rise to the most important types of spoilage. Thermal death times, determined for each species and shown graphically and in tabular form, ranged from 1.5 to 11 min at 70°C for non-spore forming species to 65 min at 100°C for Cl. bifermentans. The abnormally high heat resistance of some Cl. species is attributed to these species being heat-resistant mutants. B. subtilis had low resistance (<1.0 min at 100°C), B. thermoacidurans and B. stearothermophilus required 2-4 min at 121°C but did not cause any detectable spoilage. The existence of heat resistant Cl. mutants may explain certain cases of spoilage in canned tomatoes processed under adequate conditions. RM

12 L 1118
Microorganisms in field and mill - a preliminary survey.
Bevan, D.; Bond, J.
Proceedings Queensland Society of Sugar Cane Technologists 1971: 137-143 (1971) [15 ref. En] [Sugar Res. Inst., Mackay, Australia]

In a microbiological survey of cane fields and mills 300 different spp. of bacteria, yeasts and moulds were isolated from green, burnt, chopped and prepared canes, from milling trains, mixed juice, clarified juice and subsider mud. All were contaminated with Leuconostoc, which together with thermophilic yeasts was predominant in mixed juice. Another thermophilic organism tentatively identified as Bacillus megatherium was taken from the clarifier at 92°C. The conditions flavouring development of some of the organisms isolated are discussed. The production of metabolic breakdown products of sugar (e.g. organic acids, dextran-like materials) leads to possible interference with pol readings of mixed juice. The presence of thermophilic organisms viable at extremely high temps. indicated that losses may occur even after heating and liming. Mill cleaning and hygiene is discussed and a tentative method proposed for estimating efficiency of sterilization, especially of milling trains. RM

12 N 567
[Microbiological study of spoiled margarine. IV. Inhibition of growth by chemical preservatives.]
Inigo, B.; Castanon, M.
Revista de Agroquimica y Tecnologia de Alimentos 11 (1) 132-138 (1971) [17 ref. Es, de, en, fr] [Inst. de Fermentationes Ind., Madrid, Spain]

In order to find the min. concn. of sorbic and benzoic acid and their salts which inhibit growth of bacteria and yeasts isolated from spoiled margarine, doses of benzoic acid and sodium or potassium benzoate of 200-1000 mg/l. of sorbic acid and potassium sorbate 50-1000 mg/l. and of a benzoic-sorbic acid mixture (M) (unspecified) 500-1000 mg were tested at pH values of 3.0 to 6.3 at intervals of 0.5 pH units and starting from pH of the dissolved preservative.. Benzoic acid alone was effective at 750 mg/l. and pH 4.0 (except against Lactobacillus plantarum); sorbic acid at 300 mg/l. and pH 3.5; mixture M at 500 mg/l. and pH 4.5 (except against Staphylococcus epidermis, L. plantarum and Candida lipolytica), and at pH 4.0 (except against C. lipolytica). 500 mg/l. of sorbic-benzoic acid mixture at pH 4.0-5.0 is recommended for sweet margarines, at pH 5.0-6.0 for salted ones. RM

12 T 624
[Heterofermentative lactobacilli as cause of blowing of plastics bottles containing tomato ketchup.]
Tjaberg, T. B.; Rossebo, L.
Medlemsblad for den Norske Veterinaerforening 21 (9) 476-478 (1969) [7 ref. No]

12 S 1468
[Lactobacilli and closely related microorganisms in meat and meat products. III. Differentiation of individual groups of organisms.] Laktobazillen und eng verwandte Mikroorganismen in Fleisch und Fleischwaren. III. Abgrenzung der einzelnen Keimgruppen.
Reuter, G.
Fleischwirtschaft 50 (8) 1081-1084 (1970) [17 ref. De. en, fr] [Bitterstrasse 8-12, 1000 Berlin 33, Berlin, W. Germany]

The possibility of adapting the diagnostic key given by J. J. Cavett [J. appl. Bact. (1963) 26: 453-470] for the identification of lactic acid bacteria in meat products, to the bacterial flora in European meat products was investigated. Strains of lactobacilli, enterococci, pediococci, Leuconostoc spp., Microbacterium thermosphactum and corynebacteria were examined for growth on various selective media; morphology; gas from glucose; upper and lower growth limits; presence of catalase; behaviour in litmus milk; growth in 10% NaCl; lipolytic activity; slime production from sucrose; NH_3 production from arginine; and acetoin production from glucose. The first 5 criteria proved to be the most suitable for group identification, the others not always being group specific. A table of results is given. Two other tables are given for the species and type identification of Pediococcus and Leuconostoc strains and M. thermosphactum. They are based on the above mentioned properties and the utilization of different sugars, sugar alcohols and glycosides.
FWJ

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See also back page

1 P 13
[The influence of liquid nitrogen freezing on the microflora of fresh milk.]
Giroux, R. N.; Martin, C.; Samson, R.
Canadian Institute of Food Technology Journal 4 (2) 55-57 (1971) [3 ref. Fr, en] [Service de l'Industrie Laitiere, La Cooperative Agricole de Granby, C.P. 219, Granby, Quebec, Canada]

Changes in the microflora of raw milk were determined during frozen storage for 5 months in liquid N_2. The milk was stored in 1-ml plastics capsules and tested after 0, 1 and 14 days and 5 months, 6 capsules being examined on each occasion. Mean total count increased from 1.157 million to 2.85 million/ml after 5 months. The greatest increases were in micrococci + staphylococci (from 5000 to 56 000/ml) and enterococci (from 25 000 to 115 000/ml). Lactobacilli and coliforms increased ~3-fold and coryneforms and pseudomanads increased ~2-fold. The % Pseudomonas in the total flora was 4.7, 3.1, 5.7 and 4.2% on the 4 sampling occasions respectively. The increased counts were attributed to disruption of chains and clumps. CDA

1 P 37
[Selection of conditions for routine determination of the titre of lactic streptococci phages.]
Strzalkowska-Domanska, M.
Roczniki Instytutu Przemyslu Mleczarskiego 12 2) 7-18 (1970) [20 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

The activity of 10 bacteriophages isolated from samples of infected milk and whey was tested using 12 strains of Streptococcus lactis, 7 strains of Str. diacetilactis and 4 strains of Str. cremoris, all components of mixed industrial starters. The bacteriophage filtrates were prepared as described in Pr. Inst. Przem. mlecz. (1964) 10 (2) 33-43. Difco peptone milk supplemented with 0.3% Difco yeast extract and 0.3% NaCl was found to be the most suitable medium for bacteriophage titre determination; highest titres were obtained using a tenfold dilution of 24-h streptococcal cultures (incubated at 22°C). This method using plastics plates is recommended as being simple, rapid and sufficiently accurate for routine bacteriophage testing. SKK

1 P 38
Production of free fatty acids by lactic acid bacteria and moulds on casein medium.
Kowalewska, J.; Poznanski, S.; Jaworski, J.
Lait 51 (507) 421-430 (1971) [14 ref. Fr, en] [Inst. Inznyierii i Biotechnol. Zywnosci, Olsztyn, Poland]

Suspensions of Str. lactis, Str. diacetilactis and Str. cremoris in 3% casein solution (pH 5.6 and 6.5) at concn. of 5 mg bacteria/ml were incubated for 5 days at 25 or (for Str. cremoris) 30°C. 10% suspensions of Penicillium roqueforti, Geotrichum candidum, Rhizopus oligosporus and Zygorrhinchus moelleri in 3% casein solution (pH 5.5) were incubated for 24 h and 5 days at 15°C. Free fatty acids were estimated by a method based on that of Kuzdzal- Savoie and Kuzdzal. [See Lait (1966) 47 (461/462) 9-23]. The bacteria produced 83.5-108.8 mg free fatty acids/100 g casein at pH 5.6 and 329.5-1671.2 mg/100 g at pH 6.5. Str. lactis produced mainly acetic and propionic acids and a little butyric acid; in addition to these acids, Str. diacetilactis produced considerable amounts of isovaleric acid (638.12 mg/100 g at pH 6.5); Str. cremoris produced considerable amounts of butyric acid (223 mg/100 g). With the exception of P. roqueforti, which liberated mainly propionic acid, isovaleric acid constituted 65-70% of the free fatty acids produced by the mould species after 5 days. P. roqueforti is considered the most suitable of the moulds for cheese ripening since it produces no butyric acid and only limited amounts of isovaleric acid, but large amounts of propionic and acetic acids. CDA

1 P 43
[The formation of acetoin and diacetyl by some Lactobacillaceae in view of the biological degradation of acids.] Acetoin- und diacetal-bildung einiger Lactobacteriaceae im Hinblick auf den Biologischen Säureabbau.
Eschenbruch, R.
Vitis 9 3) 218-230 (1970) [26 ref. De] [Inst. für Mikrobiol. & Biochem. der Hessischen Lehr- & Forschungsanstalt für Wein-, Obst- & Gartenbau, Geisenheim, Rheingau, W. Germany]

1 P 44
Strain balance of multiple strain lactic streptococcus concentrated cultures.
Gilliland, S. E.
Journal of Dairy Science 54 8) 1129-1133 (1971) [9 ref. En] [Dept. of Food Sci., St. Univ., Raleigh, N. Carolina 27607, USA]

Bacteriophages were used to determine whether certain alterations in culture manufacture, necessary for the production of concentrated cultures, would adversely affect strain balance of 3 multiple-strain Cheddar cheese starters. Concentrated cultures were prepared as described previously [FSTA (1970) **2** 1P137]. Alterations in strain balance were detected by measuring acid production in the presence and absence of phage. Changes in strain balance did not necessarily affect the performance of the starter when inoculated into milk. From experiments using 2-strain cultures of lactic streptococci, with and without pH control, it is concluded that changes in strain balance are due to growing the cultures for concentrated preparations in broth rather than in milk. CDA

1 P 45
Optimum growth parameters of lactic streptococci used for the production of concentrated cheese starter cultures.
Cogan, T. M.; Buckley, D. J.; Codon, S.
Journal of Applied Bacteriology 34 (2) 403-409 (1971) [15 ref. En] [Nat. Dairying Res. Centre, Agric. Inst., Fermoy, Co. Cork, R. of Ireland]

As a preliminary to producing continuous parameters affecting growth rate in broth culture cultures of lactic streptococci, several were studied. The optimum pH for growth of 3 strains [Streptococcus lactis C6 and C10 and Str. cremoris C3] was ~6.4. The results indicate that continuous cultivation should not be carried out at temp. above ~27°C and that, in the case of Str. lactis C10, excessive aeration should be avoided. Sparging with CO_2 was unnecessary and with N_2 was deleterious to growth. AS

1 P 48
[Microbial associations in Roquefort cheese. III. Action of enterococci and lactose-fermenting yeasts with respect to lactobacilli.]
Devoyd, J. J.; Desmazeaud, M.
Lait 51 (507) 399-415 (1971) [31 ref. Fr, en] [Sta. Centrale de Recherches Laitieres, INRA (78) Jouy-en-Josas, France]

Growth of Lactobacillus casei and, to a lesser extent, L. plantarum was stimulated under the following conditions: in the presence of (i) Streptococcus faecalis var. liquefaciens in autoclaved milk but not in milk serum; in the presence of dialysable substances from (i) in Pollack and Lindner medium, the effect being more marked when (i) had been grown in autoclaved 118°C for 20 min) than in UHT (142°C for 10 sec) milk; in the presence of milk-culture filtrate of (i) in Pollack and Lindner medium but not in media used for studying folic acid; in the presence of hydrolysate obtained by the action of proteolytic enzymes from (i) on whole casein, the 2nd and 3rd of 5 fractions (mol. wt. 800-1000 and 300-600 respectively) separated by chromatography as described in part I [FSTA (1971) **3** 2P350], being stimulatory; and in the presence of Saccharomyces fragilis, Sacc. lactis or Torulopsis sphaerica, the stimulation being due to folic acid like substances. Diacetyl production by lactobacilli was stimulated by culture filtrates of (i) and enzymatic hydrolysates of casein, but not by culture filtrates of yeasts. Str. faecalis had no stimulatory effect on growth of lactobacilli. [See FSTA (1971) **3** 6P969 for part II.] CDA

1 P 64
Growth characteristics of Leuconostoc citrovorum in skim-milk fortified with liver concentrate or pancreas extract.
Goel, M. C.; Marth, E. H.
Journal of Milk and Food Technology 34 7) 357-360 (1971) [19 ref. En] [Dept. of Food Sci., Univ., Madison, Wisconsin 53706, USA]

1 P 66
[Studies of microbial flora of yoghurt and butter, particularly the psychrotrophic organisms.]
Amato, F.; Becheroni, L.; Dracos, A.
Nuovi Annali d'Igiene e Microbiologia 21 (4) 341-361 (1970) [72 ref. It, en] [Lab. di Microbiol., Ist. Superiore di Sanita, Rome, Italy]

During storage at 4°C, yoghurt was sampled weekly for 4 wk, and pasteurized butter weekly for 6 months. Lactobacilli, and aerobic and coliform organisms were counted after incubation at 32 and 5°C and yeasts + moulds at 28 and 5°C. In yoghurt the counts of lactobacilli and aerobic organisms after incubation of plates at 5°C remained at 102 and 10/g, respectively; when counts were made + °C, lactobacilli increased to a max. of 1011/g in 2 wk; aerobic counts at 32°C and yeast + mould counts at both 28 and 5°C increased progressively to $\geqslant$106/g in 4 wk. In butter there were progressive decreases in these 6 counts during the 6 months. Coliforms were absent from all the yoghurt samples and from 85% of the butter samples. JMD

1 P 71
[Suluguni cheese from pasteurized milk.]
Dilanyan, Z. Kh.; Piranishvili, A. V.
Molochnaya Promyshlennost' 32 8) 23 (1971) [Ru] [Tbilisskoe Otdelenie Vsesoyuznogo Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

Suluguni cheese was made using 3 types of starter, consisting of (i) proteolytic strains of Streptococcus lactis, Str. diacetilactis, Str. thermophilus, Lactobacillus helveticus and L. lactis, (ii) proteolytically inactive strains of the same species and (iii) a culture obtained from used in the manufacture of experimental cheeses the Dairy Research Institute (control). Milk was HTST-pasteurized at 71-72°C, and the starters were added at a rate of 1%. Organoleptic tests showed that cheeses made with starter (i) had better flavour characteristics than those made with starter (ii) or (iii). FL

1 P 108
A systematized approach to cheese ripening.
Singh, S.
Dissertation Abstracts International. Section B. The Sciences and Engineering 32 (1) 362: Order no. 71-18083 (1971) [En] [St. Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

This study investigated (i) the microbial flora and (ii) the biochemical additions needed to secure development of full cheese flavour in 40% brine slurries of rennet curd held at 30°C for ~8 days, stirred daily and maintained at pH 5.3. Full cheese flavour resulted from additions of 5% multiple mixed strains of lactic streptococci, 100 ppm reduced glutathione (GSH), 10 ppm Co, 2 ppm riboflavin and 20 ppm diacetyl. Flavour could be modified without detriment by incorporation of Lactobacillus casei cultures and pyroxidal phosphate or a mixture of $NaHCO_3$ and $CaCO_3$. Presence of GSH was essential in all cases. Desirable flavour was associated with lactic acid formation, presence of free amino groups and active -SH groups, degradation of α_s-casein (by rennin) and a low degree of reduction of triphenyl tetrazolium chloride. Heat treatment of slurries prior to addition of lactic cultures reduced the rate and extent of flavour development but not the growth of the lactic organisms. GTP

P 109
Chemical and microbiological aspects of pening of Gorgonzola cheese.]
ttogalli, G.; Resmini, P.
cienza e Tecnica Lattiero-Casearia 22 (3) 201-213 971) [2 ref. It]

Gorgonzola cheese was examined, chemically and icrobiologically, at intervals of 1 to 55 days om preparation. Chemical changes noted cluded a rapid initial rise in free amino acids nd peptides due to the degradation of casein, hich was resumed about the 30th day before ecreasing after the 45th day, with respect to mino acid content, with a corresponding rise in mines and ammonia. Formation of methyl ketones, receded by lipolysis, also became marked from bout the 30th day. Microbiological changes included: an early rise, followed by a rapid decline in the number of starter organisms; a subsequent increase, reaching a max. in 17 days in betacocci, betabacteria and organisms related to Str. lactis; mould growth apparent after the 15th day; and spore formation 30 to 45 days after manufacture. GTP

2 P 146
[Microbiology of cultured milks. Acidification and flavour of yoghurt.]
Formisano, M.; Percuoco, G.; Coppola, S.; Percuoco, S.; Germano, S.
Industrie Agrarie 9 (6) 230-245 (1971) [105 ref. It, en] [Istituto di Microbiol. Agraria, Univ., Naples, Italy]

Optimum conditions for the production of high quality yoghurt were studied. Acidity and flavour developed best on incubation of good quality clarified pasteurized homogenized milk with a 60:40 mixture of Streptococcus thermophilus and Lactobacillus bulgaricus cultures for about 3 h at 42.5°C, followed by slow cooling and storage at 4°C. Lower incubation temp. or rapid cooling to 20° or 30°C after incubation are unfavourable. Growth of the organisms is accompanied by a reduction in the catalase and an increase in the monophosphoesterase content of the milk; it is dependent on the presence of numerous water-soluble vitamins, especially B_{12}, but does not result in any vitamin synthesis. Aseptic production under the conditions specified yields a palatable nutritious hygienic material of good consistency and keeping quality. GTP

2 P 157
[Studies on the flavour and aroma-producing microflora of breakfast butter.]
Özer, I.; Özalp, E.; Ünal, T.
Türk Veteriner Hekimleri Dernegi Dergisi 38 (9) 13-15 (1968) [16 ref. Tr, en] [Vet. Fak., Univ., Ankara, Turkey]

Bacterial strains representing the predominant microflora of 92 market butter samples were identified as follows: 172 (31.1%) as Streptococcus cremoris; 104 (19.4%) Str. lactis; 90 (16.3%) Leuconostoc citrovorum; 29 (5.25%) Micrococcus varians; 23 (4.16%) Str. diacetilactis; 21 (3.8%) Leuc. dextranicum; 17 (3.1%) Str. thermophilus; 17 (3.1%) yeasts; 14 (2.5%) aerobic bacilli; 12 (2.2%) Lactobacillus casei; 12 (2.2%) L. plantarum; 10 (1.8%) L. brevis; 9 (1.6%) L. casei var. alactosus; 7 (1.3%) Str. faecalis; 5 (0.9%) L. bulgaricus; 5 (0.9%) Microbacterium lacticum; and 3 (0.5%) Micrococcus caseolyticus. [From En summ.] CDA

2 P 182
The influence of nutritional factors and of mutations on the rates of acid production by lactic streptococci.
Qutub, A. H.
Dissertation Abstracts International. Section B. The Sciences and Engineering 31 (11) 6402: Order no. 71-11254 (1971) [En] [St. Univ., Stillwater, Oklahoma 74074, USA]

25 strains of lactic streptococci (Streptococcus lactis and Str. cremoris) isolated from commercial lactic cultures, were used in trials to determine suitable N sources for growth, mineral requirements, effects of certain compounds on acid production, and development of mutants. A chemically defined medium composed of glucose, 11 amino acids, 3 nucleosides, 1 nucleotide, vitamins and minerals proved adequate for growth of all 9 cultures tested. Mineral requirements of the organisms could not be determined since the basal medium to which the minerals were to be added already contained adequate minerals for growth. A medium containing sugar, hydrolysed casein, adenosine, guanosine, uridine, cytidylic acid, buffer, vitamins and minerals supported growth of all cultures tested. Rates of acid production in milk were increased by addition of adenosine monophosphate, galactose, glucose, lactase and pyruvate. Rates of acid production were greatly increased by using a continuous flow apparatus selective for rapid production. Mutants with high rates of acid production were developed by treatment of the culture with N-methyl-N-nitro-N-nitrosoguanidine. Rate of acid production was related to the amount of β-galactosidase produced by the culture. CDA

2 P 183
[Use of lactic acid bacteria and Penicillium sp. in Gorgonzola cheese manufacture.]
Salvadori, P.; Salvadori, B. B.
Scienza e Tecnica Lattiero-Casearia 22 (3) 214-220 (1971) [It]

Certain modifications of lactic cultures and Penicillium strains used in the manufacture of Gorgonzola cheese which promise to be useful are considered. Additions of 5% of a mesophilic culture to the thermophilic starter mixtures usually employed have given good results in preliminary experiments. 3 strains of Penicillium roqueforti var. Weidemanni designated NO, PV and BS respectively and differing in proteoly and lipolytic activities have also been deve and should make it possible to produce varied degrees of flavour or to compe seasonal differences in the microbic flora of the cheese milk. Possible sou flavour, bitterness and excessive develo, mould colour are also discussed. GTP

2 P 203
[Process and equipment for producing cultured milk beverages.] Verfahren und Vorrichtung zur Herstellung von Sauermilchgetränken.
Exler, H. (Münsterländische Margarinewerke J. Lülf)
West German Patent Application 1 792 084 (1971) [De]

To milk cultured with Streptococcus cremoris and Str. lactis to a pH of ~4.5 is added ~30 g of an aqueous fruit juice solution with an acid number of 91-98 and containing ⩾3 g citric acid/l. Then a mixture of sugar and a highly esterified, easy-gelling pectin obtained from citrus fruit is admixed, 3.5-8 g pectin/l. being used. The whole is homogenized in a 1st stage at 12-16°C and a pressure of 150-160 atm. and in a 2nd stage at 53°C at 350-380 atm. The product is then pasteurized for 20-30 min at 60-65°C. Shelf life is claimed to be several weeks. W&Co

2 P 217
A study of the characteristics of desulphydrase isolated from Cheddar cheese.
Chappell, R. A.
Dissertation Abstracts International. Section B. The Sciences and Engineering 32 (2) 1009: Order no. 71-18898 (1971) [En] [Univ., Minneapolis, Minnesota 55414, USA]

Desulphydrase activity could not be isolated or concentrated from Cheddar cheese extract. Methods for the continuous measurement of H_2S production due to cysteine-splitting activity were based on (i) methylene blue reduction and (ii) the use of a specific sulphide ion electrode. H_2S was produced in the extracts in either aerobic or anaerobic conditions at a fairly high optimum temp. (60-70°C) over a narrow pH range at ~7.0. Desulphydrase-like activity of cheese, milk, rat liver and rennet was stable and even activated at high temp. (121°C for 5 min); H_2S was released from glutathione using cheese extract. Reduced desulphydrase activity was observed in milk after the growth of lactic starter cultures. SAC

2 P 218
['Delicia' cheese, a new variety of fresh cows' milk cheese.]
Sajgo, I.
Industria Alimentara 22 (1) 41-42 & 45 (1971) [Ro, en, fr, de, ru] [Ind. Laptelui Harghita, Roumania]

Two methods, a slow one at 22°C and a rapid one at 32°C, are described for the manufacture of 'Delicia' cheese, a new Roumanian product of the Cottage cheese type, from pasteurized cows' skim-milk using rennet and a Streptococcus lactis, Str. cremoris, Str. citrovorus, Str. paracitrovorus and Str. diacetilactis starter. The cheese should contain ⩽80% moisture, ⩾20% fat in DM and ⩽1.1% salt. SKK

2 P 244
[Hygienic requirements for infant foods.]
Hygienische Anforderungen an Säuglingsnahrung.
Mossel, D. A. A.; Grün, L.
Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, I. Abteilung, Originale, Serie B 155 (2) 103-116 (1971) [120 ref. De, en] [Centraal Inst. voor Voedingsonderzoek TNO, Zeist, The Netherlands]

Samples of raw milk, destined for manufacture of sterilized 'ready-made' milk for infants, were obtained from various farms and examined bacteriologically and for pesticides. Bacterial counts/ml were as follows: total count, from 10^3 to 2×10^5; Gram-negative bacilli, from <10 to 9×10^4; Staphylococcus aureus, from 40 to 7000; group D streptococci, from <10 to 8000; clostridia, <1; and Bacillus cereus, from <10 to 90. No antibiotics were detected in the raw milk. Additional substances used in manufacture (saccharose and Sirona) also had low bacterial counts of ~1000/ml. The vitamin content of the milk changed little during uperization and packaging, and levels of pesticides in the product were $<10^{-3}$ μg/ml ($<2 \times 10^3$ μg/ml for DDT), which was only ~0.1 × levels reported in breast milk. All samples of the product were sterile after incubation for 1 month at 30°C. The following norms are recommended for 'ready-made' infant milk: total microbial count, <50 000/ml; Gram-negative bacilli, <5000/ml; staphylococci and group D streptococci, <500/ml; insecticides and pesticides, $<2 \times 10^{-3}$ μg/ml. CDA

[Appearance of bacteriophage active against Streptococcus thermophilus during preparation of lactic cultures for Gorgonzola manufacture.]
Sozzi, T.; Sella, F.
Annali di Microbiologia ed Enzimologia 20 (1/2/3) 74-80 (1970) [8 ref. It, en] [Istituto di Microbiol. Agraria e Tecnica, Univ., Bologna, Italy]

Investigations of different levels of acidity brought about by apparently identical mixed cultures of Streptococcus thermophilus and Lactobacillus lactis, used in the production of Gorganzola cheese, indicated that the differences were probably due to a bacteriophage specific for Str. thermophilus. Bacteriophages isolated from whey at 2 cheese factories were found to be particularly active against strains of Str. thermophilus present in commercial cultures, although inactive against strains of the same species isolated from raw milk. ECA

3 P 273
[Calculation of separation effect in the peripheral part of clarifier bowls.]
Surkov, V. D.; Krylov, V. V.; Dokuchaev, V. V.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1970 (1) 100-104 (1970) [3 ref. Ru] [Moskovskii Tekh. Inst. Myasnoi i Molochnoi Promyshlennosti, Moscow, USSR]

A mathematical interpretation of the separation processes of suspensions in the peripheral part of clarifier bowls is presented and experiments are described on clarification of Streptococcus lactis aqueous suspensions in the 'Volga 51' laboratory milk clarifier. In different tests, groups of 6 discs situated at the bottom, middle or top respectively of the 21-disc back were blocked and the clarifying effect was assessed by bacterial counts and nephelometric measurements. The clarifying effect increased as the number of free disc inter spaces above the blocked discs increased, the most efficient elimination of the bacteria (reduction from the initial 200×10^3 to 60×10^3/ml) being obtained when this number was raised to 14. SKK

3 P 288
[Influence of freezing and subsequent freeze-drying on the rate of survival and percentage of two lactic acid bacteria (mixed culture). Streptococcus thermophilus and Lactobacillus acidophilus.]
Jabarit, A.
Lait 51 (505/506) 302-327 (1971) [6 ref. Fr, en]

The rate of survival and relative % of Streptococcus thermophilus and Lactobacillus acidophilus were determined in mixed (1:1) cultures of the 2 organisms before and after freezing at -20, -25, -30, -35 or -40°C and subsequent freeze-drying, the third phase of the freeze-drying process taking about 5-15 min at 30-35°C. As the freezing temp. decreased, the relative % of streptococci in the mixture increased and was a max. (~55%) at freezing temp. of -20 to -30°C; divergenicies were not so large in the freeze-dried cultures, a peak Str. thermophilus % of ~53 being reached when freezing temp. of -25°C had been applied. After freezing at -20, -30 and -40°C respectively, viable counts at the end of the log phase were 10^{10}, 10^{11} and 10^{10}/ml in fresh culture, 10^9, 10^{10} and 10^9/ml in frozen culture and 10^9, 10^{10} and 10^9/ml in freeze dried culture. The count decreased progressively as the freezing temp. was lowered from -5 to -20°C, but lower freezing temp. had no additional destructive role. [See also FSTA (1971) 3 5P703 & 5P704.] CDA

3 P 289
[Physiological requirements and viability of 5 mixed cultures in freeze-concentrated media and media enriched with protective substances and growth factors.]
Jabarit, A.
Lait 51 (507) 437-453 (1971) [28 ref. Fr, en]

5 mixed cultures investigated were Streptococcus hermophilus with Lactobacillus bulgaricus, L. ıelveticus or L. acidophilus, and Str. lactis with L. acidophilus or L. helveticus. Optimum conditions for freeze concentration were a freezing temp. of -35 to -40°C with a surface temp. of 30-35°C, viability being max. when the cycle took 6-8 h. Optimum concn. of the reconstituted dried skim-milk was 20-25% TS; at higher TS levels, increased osmotic pressure resulted in slow fermentation. Addition of 10% saccharose + 5 or 10% orange pulp (carotenoid source) before inoculation protected the lactic acid bacteria during freeze-drying in skim-milk containing only 14% TS. Survival of streptococci was slightly favoured. However, the resulting products were too sweet and had a pronounced orange flavour. Riboflavin + folic acid + pyridoxine + calcium pantothenate had a similar protective effect on the lactic acid bacteria in skim-milk with 14% TS. Utilization of freeze-dried preparations in the milk, dietetic and pharmaceutical industries is envisaged. (See also preceding abstr.) CDA

3 P 293
Influence of lactic cultures and curd milling acidity on flavour of Cheddar curd slurries.
Singh, S.; Kristoffersen, T.
Journal of Dairy Science 54 (11) 1589-1594 (1971) [14 ref. En] [Dept. of Dairy Tech., Agric. Res. and Development Center, Columbus, Ohio 43210, USA]

Slurries, with and without reduced glutathione (GSH), were used to determine the effects of lactic cultures and curd milling acidity on the development of flavour and biochemical changes in Cheddar curd. The order of flavour preference was for curd made with a commercial mixed strain all-purpose culture, then Streptococcus cremoris C_{13}, Streptococcus lactis C_{10}, and finally a commercial buttermilk culture; for milling acidity, the order was for curds milled at 0.55, 0.45, and 0.35% acidity, regardless of culture. Slurries with GSH developed more characteristic flavour than those without GSH. Concn. and changes of lactic acid, free fatty acids, acidic carbonyl compounds and active -SH groups were followed in the slurries; overall, only lactic acid was related to flavour development. [See also FSTA (1970) 2 8P1126.] AS

3 P 299
[Nisin-producing streptococci. II. The microflora of Grana cheese and Str. lactis bacteriophages.]
Carini, S.; Gregori, A. de; Sozzi, T.
Scienza e Tecnica Lattiero-Casearia 22 (3) 149-166 (1971) [15 ref. It, en] [Istituto di Industrie Agrarie, Univ., Milan, Italy]

Nisin-producing strains of Streptococcus lactis (annual average count, 100 000/ml) were found in milk used for production of "Parmesan-Reggiano grana" cheese, but were not present in the milk for "Padano grana" cheese. All Lactobacillus strains studied were inhibited by 5-50 RU nisin/ml; streptococci, other than Str. bovis and Str. faecalis var. liquefaciens were inhibited by 1-100 RU nisin/ml; sensitivity of micrococci and propionibacteria varied from insensitive to inhibited by 1-5 RU/ml; dairy yeasts were not inhibited. A few strains amongst both nisin-producing and non-producing Str. lactis were found to be sensitive to several streptococcal bacteriophages, individual strains differing in phage psecificity. Only a few strains among the dairy microflora were able to inactivate nisin, among them, Str. faecalis var. zymogenes, Str. faecalis var. liquefaciens, Str. diacetilactis and Escherichia coli, all of which caused 10-20% decrease in nisin activity. Results showed it to be useful to add either nisin or nisin-producing streptococci to the starter for Grana cheese, resulting in inhibition of clostridia and the avoidance of blowing of the cheese [See also FSTA (1970) 2 7P860.] ECA

3 P 320
[Effect of mesophilic lactic acid bacteria on growth of coliforms in milk.]
Sukhova, T. S.
Molochnaya Promyshlennost' 32 (6) 24-26 (1971) [9 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

Sterile milk samples were each inoculated with 3% of a pure single-strain culture of one of a total of 10 strains of Str. lactis and Str. cremoris together with a 24 h broth culture of Escherichia coli 86 to give about 10 E. coli/ml, a level normally found in pasteurized milk; sterile milk inoculated with the broth culture only was used as control. Incubation was at 26°C. The effect of the lactic acid bacteria on the E. coli was studied in terms of the colony count of E. coli on Endo agar. The Str. lactis strains all inhibited the growth of E. coli at ~24 h, but during the first 6 h their action differed; some strains showed a strongly stimulatory effect (up to ~3 h) followed by an equally strong inhibitory effect. In the presence of Str. cremoris, the number of E. coli cells did not increase after the first 3 h. HBr

3 P 325
[Yoghurt production through slow acidification at 30°C.] Joghurt-Herstellung durch Langzeitsäuerung bei 30°C.
Busch-Johannsen, G.; Grow, K. D.; Kapoor, J.
Deutsche Molkerei-Zeitung 92 (34) 1460-1463 (1971) [De] [Lab.' Wiesby, Niebüll, W. Germany]
This is a progress report on the development in 'Wiesby' Laboratory of a slow acidification method for yoghurt production enabling the use of acidification tanks during the night and of packaging facilities from the beginning of the working day. Experiments are described on culturing milk during 8-12 h at 30°C using 'Joghurt Typ 30' starter in combination with 'Sc. Filant', a slime-producing variant of an unnamed Streptococcus sp., 'Viskos D', a 'bio-activator' and Leuconostoc citrovorum. Progress of ripening is described in diagrams and shown in tables; guide literature may be obtained from the Laboratory. SKK

3 P 347
[Configuration of lactic acid in Emmental cheese.] Die Milchsäure und deren Konfiguration im Emmentalerkäse.
Steffen, C.; Blanc, B.
Schweizerische Milchzeitung 97 (82) Wiss. Beil. Nr. 126: 1079-1084 (1971) [9 ref. De, fr, en] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld/Berne, Switzerland]
Concn. and configurations of lactic acid were determined at intervals during the ripening of Emmental cheese. Average concn. at 24 h and 3 months after preparation were 137 and 52 μmol/g cheese, of which the L(+) form provided 70% and 55%, respectively. Maximum development of acid occurred in 30 days, followed by a rapid fall. Development was atypical and reached its maximum in 3 days if the cheese was prepared in steel instead of the usual copper equipment. Ripening by strains of Streptococcus thermophilus or Lactobacillus lactis or L. helveticus alone produced cheeses which differed from normal in formation, degradation and configuration of lactic acid; cheeses prepared by the first 2 organisms being inferior in consistency and flavour. (See also preceding abstr.) GTP

3 P 355
[Study of the interactions between various thermophilic and mesophilic lactic acid bacteria in relation to the manufacture of Gruyere cheese.]
Accolas, J. P.; Veaux, M.; Auclair, J.
Lait 51 (505/506) 249-272 (1971) [18 ref. Fr, en] [Sta. Centrale de Recherches Laitieres et de Tech. des Produits Animaux, INRA (78) Jouy-en-Josas, France]
In 10% (w/v) reconstituted dried skim-milk wh had been heated at 80°C for 30 min or autoclaved at 110°C for 10 min, and inoculated with any one of 3 strains of Streptococcus thermophilus, the addition of a single strain of one of 14 strains of thermophilic lactobacilli (Lactobacillus bulgaricus, L. helveticus, L. jugurti and L. lactis), one of 4 strains of mesophilic lactic streptococci (Str. lactis and Str. cremoris) or an amino acid mixture (24 mg leucine + 14.4 mg valine + 7.4 mg histidine/100 ml), stimulated acid production; the mixture leucine + isoleucine (28 mg/100 ml) + valine onl stimulated 1 strain of Str. thermophilus. In milk heated at 80°C for 30 min, but not in autoclaved milk, the addition of formic acid, adenine or certain strains of Str. thermophilus each stimulated acid production by L. bulgaricus [see FSTA (1969) 1 1P127] and by L. lactis, but, in general, hat little or no effect acid production by L. helviticus and L. jugurti, the response varying from strain to strain. Acid production by some strains of mesophilic lactic streptococci was stimulated by L. helveticus and Str. thermophilus. The role of these symbiotic effects in relation to the manufacture of hard cheeses is discussed. SAC

3 P 367
Kumar, S.
Dissertation Abstracts International. Section B. The Sciences and Engineering 32 (4) 2221: Order no. 71-27505 (1971) [En] [St. Univ., Columbus, Ohio 43210, USA]

Unlike IgG1, IgG2 and IgM, IgA was not detected in all samples of milk and colostrum from individual cows. IgM was isolated from a crude mixture of the immunoglobulins, precipitated from milk using ammonium sulphate, by the following methods: (i) ion-exchange chromatography on DEAE-cellulose and a gradient of 0-1.0M NaCl; (ii) ion-exchange chromatography on DEAE-Sephandex A-50 with a gradient of 0.02-0.3M, pH 7.0, phosphate buffer; or (iii) density gradient employing 10-40% sucrose in 0.1M Tris-HCl buffer, pH 8.0, containing 0.15M NaCl. Isolated IgM showed the following characteristics:sedimentation constant (S_{20}) values, 18.2-19.8; extinction coeff. (E 1% at 280 nm), 11.8; total carbohydrate content, 10.78 ± 0.31% (consisting of hexose, 5.13 ± 0.12%; fucose, 1.25 ± 0.05%; sialic acid 1.40 ± 0.05%; hexosamines, mainly N-acetylated 2.90 ± 0.09%); SH groups, 43.4 per mole (indicating 21 S-S bonds per mole). An agglutinating effect, but no bactericidal activity was exhibited by IgM against Streptococcus cremoris R-1 and Str. lactis C-2; growth of Str. agalactiae OARDC and Escherischia coli OSU66 was delayed initially by IgM but recovered to a rate similar to controls not containing IgM. SAC

3 P 386
[Effect of certain factors on microbial synthesis of thiamin and riboflavin in milk.]
Vliyanie nekotorykh faktorov na biosintez tiamina i riboflavina v moloke mikroorganizmami. [A thesis]
Abu-Dun'ya, S. A. [Abou-Donia, S. A.]
14pp. (1971) [7 ref. Ru] Moscow, USSR: Sel'skokhoz. Akad. imeni K. A. Timiryazeva

Cultures of 4 strains of Streptococcus lactis, 2 of Str. cremoris, 2 of Str. acetoinicus, 2 of Str. diacetilactis, 6 of Str. thermophilus, 6 of Lactobacillus acidophilus, 6 of L. bulgaricus, 3 yeasts from milk, beer and koumiss respectively and Torula kefir were added singly at 5% to skim-milk, previously heated to 95°C for 30 min and cooled, (i) alone, (ii) with 4 methyl-5-β-hydroxy-ethylthiazole, (iii) with 2-methyl-4-amino-5-hydroxy-methyl pyrimidine, or (iv) with (ii) + (iii), each added at 1 ug/ml milk. Each inoculated milk sample was incubated for 10 h at 'optimal temp.' and cooled to and stored at 8°C. Contents of thiamine and riboflavin were determined fluorimetrically after 24 h and 48 h. Mean values for 3 replicates are tabulated for % increases or decreases in thiamine and riboflavin contents of (i)-(iv) in comparison with those in the original milk. SKK

3 P 396
Studies on the associative growth of some streptococci.
Kothari, S. L.; Nambudripad, V. K. N.; Laxminarayana, H.
Milchwissenschaft 26 (7) 415-418 (1971) [11 ref. En, de] [Nat. Dairy Res. Inst., Karnal, India]

Nine strains of Streptococcus lactis, 7 of Str. cremoris and 1 of Str. diacetylactis were grown singly or in pairs in skim-milk. The rate of lactic acid production by 13 pairs of strains was greater than that of the single constituent strains. This increased rate of acid production was due to stimulation of one of the two strains by an unidentified metabolic product of the other. No strain dominance was detected amongst any of the pairs. MJL

3 P 407
[Microbiological composition of some imported streptococcal starters for butter.] In "Microbiologia. Vol. I." [Conference proceedings]
Scortescu, G.; Mavromati, E.
pp. 699-703 (1970) [7 ref. Ro, en] Bucharest, Roumania: Societatea de Stiinte Biologica [Inst. de Cercetari Alimentare, Bucharest, Roumania]

75 strains of bacteria isolated from 1 imported Danish butter starter were identified by taxonomic studies as belonging to the following spp. in the proportions stated: Streptococcus lactis, 6.6%; Str. cremoris, 20%; Str. diacetilactis, 37.4%; and Leuconostoc sp., 36%. 78 strains isolated from another Danish starter were distributed as follows: Str. cremoris, 9%; Str. diacetilactis, 44%; and Leuconostoc sp., 47%. [See also Scortescu et al., Industria aliment., Buc. (1968) 19 (6) 308-11.] SKK

3 P 418
Rapeseed meal: XIX. The effect of rapeseed meal in cows' feed on the ripening process of semi-hard cheese.
Hoppe, K.; Kozlowska, H.; Rutkowski, A.
Milchwissenschaft 26 (5) 294-297 (1971) [11 ref. En, de] [Univ. of Agric., Olsztyn, Poland]

Cheeses were made from pasteurized and unpasteurized milks obtained from cows fed for 68 days on a diet including 5 kg concentrates/cow daily, containing either groundnut meal (control) or rapeseed meal (38%). After 24 h, cheeses made from RM milk (from cows fed rapeseed meal) contained 40% more lactose than cheeses made from the control milk. Compounds present in RM milk appeared to affect the proteolytic activity of lactic acid bacteria; cheeses from RM milk contained higher non-protein N and lower amounts of amino N and non-casein N. Differences observed at 24 h did not level out on ripening; SCN would seem to delay the ripening process. [See Milchwissenschaft **26** (1) 19-23 for part. XVII.] SAC

3 P 427
[Research on Parmigiano-Reggiano cheese. I.]
Carini, S.; Cerutti, G.; Ottogalli, G.; Resmini, P.; Volonterio, G.
Industrie Agrarie 8 (5) 147-156 (1970) [9 ref. It, en] [Istituto di Ind. Agrarie, Univ., Milan, Italy]

Chemical and microbiological examinations of milk from establishments in neighbouring highland and lowland areas of Reggio Emieia were conducted to determine how far these factors contributed to the generally recognised superiority of the cheese prepared in highland. Highland milk averaged higher in titratable acidity (6.54 vs. 6.31% SH, $P<0.05$), DM (11.67 vs. 11.31%), total phosphate (0.0926 vs. 0.0903%) and lactose (5.01 vs. 4.88%, $P<0.05$) and lower in chloride 0.104 vs. 0.113%. $P<0.05$). It also coagulated more rapidly with rennet and formed a firmer curd. Nevertheless these characteristics were not associated with significant differences in calcium content or pH. Highland milk averaged higher in total bacterial count (2.948 million vs. 1.768 million/cc) and lower in count of lactobacilli (195 vs. 1570/cc). These counts and those of other bacterial groups were markedly affected by seasonal and stall factors. Good quality cheese was obtained from both types of milk. GTP

3 P 430
[Proteolytic activity of some microorganisms responsible for maturation of blue-veined cheese.]
Lusiani, G.; Bianchi-Salvadori, B.; Salvadori, P.
Lait 51 (507) 431-436 (1971) [12 ref. Fr, en] [Centro Sperimentale del Latte, Milan, Italy]

Autoclaved 10% reconstituted dried skim-milk + 10% NaCl was inoculated at 34°C with one of various lactic acid bacteria and incubated at that temp. for 1 h then stored for 4 days at 22°C followed by 27 days at 4°C. Lactobacillus bulgaricus, Streptococcus thermophilus, Str. lactis and Str. cremoris showed only slight coagulation at the end of the 31-day period, with L. bulgaricus showing slight proteolysis. Str. diacetilactis showed coagulation on the bottom after 31 days. Str. faecalis and Str. faecalis var. liquefaciens produced coagulation after 4 days, the latter showing slight proteolysis; after 31 days, proteolysis was partial and complete respectively. Final pH of the cultures ranged from 3.9 for Str. lactis to 5.65 for Str. faecalis var. liquefaciens. L. bulgaricus, Str. faecalis and Str. faecalis var. liquefaciens liberated the greatest total amounts of 24 amino acids, and only these 3 organisms liberated methionine; all 3 liberated quite a high proportion of leucine (5.7, 6.1 and 11.3 mg/100 g milk respectively); Str. faecalis liberated 10.3 mg γ-aminobutyric acid and L. bulgaricus liberated 7.5 mg glutamic acid/100 g; cystine was only liberated by Str. faecalis var. liquefaciens and tryptophan and α-aminobutyric acid only by L. bulgaricus. These casein degradation products have yet to be compared with those of Penicillium roqueforti. [See also FSTA (1969) 1 9P832.] CDA

4 P 448
[Preparation of new pure cultures of bacteria isolated from natural environment for manufacture of Swiss-type cheese. I. Characterization of strains isolated from whey in a Swiss cheese factory.]
Bijok, F.
Roczniki Instytutu Przemyslu Mleczarskiego 12 (3) 39-68 (1970) [15 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

Experiments are described on the isolation of bacterial strains from whey used as a natural factory starter in production of Gruyere cheese in Switzerland, and on their characterization in Poland. 4 strains were classified as Streptococcus thermophilus, 3 as Lactobacillus helveticus and 1 as L. lactis. Mixed culture prepared from the isolated strains was found to have activity and rate of milk acidification similar to those of standard cultures from the Pure Cultures Laboratory in Olsztyn, Poland. SKK

4 P 449
[Nature of some bitter products formed during cheesemaking.]
Buzov, I. P.; Zvyagintsev, V. I.; Zemlyanukhin, A. A.
Voprosy Pitaniya 30 (6) 61-63 (1971) [10 ref. Ru, en] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

500 ml batches of sterilized milk supplemented with $CaCO_3$ and rennet were inoculated separately with 2% of each of 11 strains of Streptococcus lactis or of 2 strains of Str. cremoris and were incubated for 7 days. The incubation mixture was centrifuged and the peptides present in the supernatant liquid were fractionated by gel filtration. The fractions with bitter taste were combined, extracted with $CHCl_3$, the extract was evaporated to dryness, repeatedly extracted with diethyl ether, dissolved in acetone, centrifuged, dried, taken up in $CHCl_3$ and IR spectra and amino acid compositions were determined. Irrespective of streptococcal strain, the bitter peptides had the same structure (probably a cyclic lactam) and amino acid composition (Phe, Leu, Val, Tyr, Pro, Ala, Glu, Gly, Ser and His were present). SKK

4 P 454
Salt tolerance of local strains of lactic acid bacteria (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov nezhvusovskoi konferentsii po molochnomu delu".
Dilanyan, Z.; Magak'yan, D.
pp. 301-304 (1971) [10 ref. Ru] Erevan, USSR: zdatel'stvo Aiastan [Erevanskii Zoovet. Inst., JSSR]

The tolerance to salt of 36 local strains of lactic cid bacteria (Streptococcus thermophilus, Str. remoris, Str. lactis, Lactobacillus bulgaricus and .. casei) was assessed from their capacity to oagulate sterile milk with 2, 3, 4 or 5% NaCl over eriods of up to 48 h. Of 12 strains of lactobacilli were very sensitive, coagulating milk with 2% salt fter 48 h whilst the remaining exhibited generally onsiderable tolerance. 8 strains of Str. lactis and tr. cremoris were most salt tolerant, producing oagulum of normal consistency at 4-5% NaCl oncn.; Str. thermophilus strains were least olerant. The importance of salt tolerance of lactic ultures for the manufacture of pickled cheese is nphasized. FL

P 457
Effect of trace elements on the acceleration of Chanakh cheese ripening. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik okladov mezhvuzovskoi konferentsii po iolochnomu delu".
Dilanyan, Z.; Agababyan, A.; Saakyan, R.; Amirkhanyan, R.
p. 191-194 (1971) [10 ref. Ru] Erevan, USSR: zdatel'stvo Aiastan [Erevanskii Zoovet. Inst., JSSR]

2 mixtures of trace elements, consisting of (i) , Mn, Cu, Zn, I, Br, Sn, Ni and Co, and (ii) Fe, In, Zn, Cu and Co were added at concn. of :1000, 1:3000, 1:6000 or 1:9000 to milk before oagulation. The effect of the 1:6000 dose, which as found optimal for the development of lactic cid bacteria, was studied throughout 60 days of heese ripening. The average content of soluble N ompounds and their proportions in the total N ompounds in the ripe cheese (at 60 days) were igher for the experimental than control batches, articularly for those made with mixture (i). The lavour of the cheese was not affected by the ddition of the trace elements, and it is concluded hat their use accelerates somewhat the ripening of ickled cheeses. FL

4 P 467
[The microorganisms of Camembert-type cheese. III. Effect of NaCl on the microflora.]
Kikuchi, T.; Takafuji, S.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] **42** (6) 268-275 (1971) [30 ref. Ja, en]

Microbial growth and changes in the microflora were followed during ripening of Camembert cheeses with 0, 2, 3 or 4% NaCl content. Streptococcus lactis and Str. cremoris, originating from the starter, were the predominant bacteria in the low-NaCl cheeses, and were mostly found at the surface, where the NaCl content tended to be lowest. Leuconostoc dextranicum predominated at the centre of all cheeses, and also at the surface of the 3 and 4% NaCl cheeses, where mould growth was poor. The microflora was more varied in cheeses with the higher NaCl contents; yeasts and lactobacilli were sometimes found, particularly at the surface, but were not considered to be important in the ripening of Camembert cheeses. [From En summ.] CDA

4 P 468
[The microorganisms of Camembert-type cheese. IV. Effect of NaCl on ripening.]
Kikuchi, T.; Takafuji, S.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] **42** (6) 276-280 (1971) [21 ref. Ja, en]

Proteolytic activity was investigated during ripening of the Camembert-type cheeses described in the preceding abstr. Soluble N (soluble at pH 4.4) was highest in the low-NaCl cheeses and decreased with increasing NaCl content. Tyrosine content showed a similar pattern of decrease. Non-protein N (soluble in 12% trichloroacetic acid) showed little variation with NaCl content, but was slightly lower throughout ripening in 4% NaCl cheeses. With low-NaCl cheese, more soluble N was found at the surface than at the centre, but non-protein N and tyrosine were fairly evenly distributed. It is suggested that protein is first degraded to soluble N mainly by the action of moulds, then proteolysis by lactic acid bacteria sets in, resulting in the formation of smaller molecular N compounds; the higher the level of Str. lactis and Str. cremoris in the cheese, the greater is the formation of small molecular N compounds. [From En summ.] CDA

4 P 492
[Prospects for using lactic acid bacteria biomass instead of starters.]
Poznanski, S.; Rymaszewski, J.; Kornacki, K.; Surazynski, A.
Przeglad Mleczarski **20** (9) Kwartalny Dodatek Naukowy No. 3: 4-7 (1971) [16 ref. Pl] [Inst. Inzynierii i Biotech. Zywnosci, WSR, Olsztyn, Poland]

Streptococcus lactis T_1, Str. diacetilactis 157 and Str. cremoris 319 were grown separately by a mass production method [Bergere, Lait (1968) **48** (471/472) 1-11; 13-30]. After completion of the logarithmic phase of growth, the biomass was separated by centrifugation, placed in sterile skim-milk and frozen at -25°C (FB), or the cultures were cooled to 5°C (CC). Edam-type cheeses were made in 1 series of experiments using a commercial starter or FB added after whey separation at 0.2% of the milk; in a 2nd series, a starter composed of the 3 streptococcal strains (1:1:1) was used or 2% of a 1:1:1 mixture of (CC) of the 3 streptococcal strains was added to milk before rennetting; in a 3rd series of experiments, either FB at 0.15% or CC at 1.5% or a starter composed of the 3 strains were used, the propertions of Str. lactis : str. diacetilactis : Str. cremoris being 2:1:1. Changes in pH, buffering capacity, lactose content and protein degradation were measured during ripening of the cheeses. It is concluded that the biomass of lactic acid bacteria could be successfully used in cheesemaking and that shortening of curd working time and ripening time could thereby be achieved. SKK

4 P 522
[Inhibitory effect of DDT residues on lactic acid fermentation and its consequences in the dairy industry.]
Barzu, A.; Unterman, W.; Aizicovici, H.; Ionescu, R.; Mihailovici, E.; Moscovici, M.
Industria Alimentara **21** (10) 595-596 (1970) [11 ref. Ro, en, fr, de, ru]

In laboratory experiments, 5% Streptococcus thermophilus and Lactobacillus bulgaricus starter followed by 0.05, 0.1, 0.2, 0.5, 1, 2.5 or 5 ppm DDT were added to cooled samples of boiled milk, and 200-ml portions were incubated at 36-42°C; titratable acidity was measured at intervals and coagulation time was determined. DDT caused delays of up to 30 min in coagulation times of ~3.5 h. In a further series of experiments, only 0.2% starter was added and incubation was at 22-24°C; coagulation times ranged from 42 to 57 h and presence of DDT caused delays of 1-15 h, the magnitude of the delay increasing with DDT concn. SKK

4 P 523
Effect of potassium sorbate on yoghurt cultures.
Hamdan, I. Y.; Deane, D. D.; Kunsman, J. E., Jr.
Journal of Milk and Food Technology **34** (6) 307-311 (1971) [12 ref. En] [Div. of Animal Sci., Univ., Laramie, Wyoming 82070, USA]

Potassium sorbate (0.05 and 0.10% w/v) reduced the production of acid and acetaldehyde by 3 commercial yoghurt cultures grown in milk fortified with 3% dried skim-milk at 45°C; during subsequent storage at 4°C, acetaldehyde decreased more rapidly when sorbate was present, but decrease in pH was slower. The growth of both Lactobacillus bulgaricus and Streptococcus thermophilus, constituents of all 3 yoghurt cultures, was reduced by sorbate. 0.1% sorbate had a greater effect than 0.05% sorbate on all characteristics studied. MJL

4 P 527
[Low-calore butter.]
Sozzi, T. (Societe des Produits Nestle SA)
Swiss Patent 506 952 (1971) [Fr]

Fresh cream containing 35% fat is pasteurized at 72°C for 30 sec and then centrifuged to a 60% fat content. The concentrated cream is heated rapidly, e.g. in a tubular or plate heat-exchanger, to 90°C, and a mixture of skim-milk and sufficient acid culture of Streptococcus diacetilactis is added to bring the pH to 5.2-5.6 and the proportion of fat to 48-52%. The product has the consistency and taste of butter but is low in calories, containing 49-51% of milk fat, ~2% protein and 47-49% water. W8

4 P 532
[Changes in N substances during ripening of Armyansk cheese made using starters with X-ray mutants of bacteria. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Dilanyan, Z.; Sarkisyan, R.
pp. 155-158 (1971) [8 ref. Ru] Erevan, USSR: Izdatel'stvo Alastan [Erevanskii Zoovet. Inst., USSR]

Changes in N compounds and free amino acids were determined immediately after manufacture, a 10 days, after pickling, and in the ripened cheese, using 3 starters: (i) proteolytically acitve X-ray mutants of lactobacilli (2 Lactobacillus helveticus strains and 1 L. casei strain) plus 3 Streptococcus lactis strains and 2 Str. diacetilactis strains, (ii) as (i), excluding mutants, and (iii) normal starter recommended for Armyansk cheese. Total soluble N content was highest throughout in the cheeses made with starter (i), average values at maturity in comparison to (ii) and (iii) being 0.737% vs. 0.583 and 0.591%, respectively; corresponding values for soluble non-protein N were 0.405, 0.317 and 0.321%. Contents of the 20 free amino acids, found in all of the 3 cheese variants, were similar to those of soluble N, being highest at all ripening stages in variant (i); mean values for 3 batches at maturity for cheeses (i), (ii) and (iii) were 212.1, 162.6 and 166.1 mg%, respectively. It is concluded that the use of starters containing X-ray mutants may possibly shorten the ripening period of the cheese. FL

4 P 554

[Characterization of NaCl-tolerant coliform bacteria from milk.] Zur Charakterisierung der in Milch verbreiteten kochsalztoleranten Coliformen.

Abo-Elnaga, I. G.

Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, II. Abteilung **126** (6) 566-574 (1971) [23 ref. De, en] [Milchwirtschaftliche Abteilung, Fak. für Landwirtschaft, Univ., Assiut, UAR]

114 strains of coliform bacteria were isolated from 46 samples of raw market milk from Assiut after enrichment by addition of 7% NaCl and incubation for 48 h at 33°C. Isolates comprised 32 Aerobacter aerogenes type I, 4 A. aerogenes II, 52 A. cloacae, 7 Escherichia coli I, 8 E. coli II, 7 E. freundii I, 2 E. freundii II, and 2 irregular forms. Optimum temp. for gas formation in 7 strains of A. aerogenes ranged from 25 to 37°C, and the strains generally formed more gas in raw milk than in sterile skim-milk. 0.08-0.1% KNO_3 failed to prevent gas formation by 7 of 9 A. aerogenes strains tested in sterile skim-milk + 7% NaCl; the other 2 strains failed to produce gas in the presence of 0.02% KNO_3. All 9 A. aerogenes strains tested were able to grow in the presence of nutrient broth containing 8.75% NaCl. In the presence of 0.05% H_2O_2 in sterile skim-milk, 1 of 4 strains of A. aerogenes was destroyed after 10 min, 2 after 30 min and 1 after 40 min at 35°C. [See also FSTA (1969) 1 9P783.] CDA

4 P 555

[Proteolytic activity of lactic acid bacteria. (In "Physiology and biochemistry of microorganisms.")] In "Fiziologiya i biokhimiya mikroorganizmov".

Zalashko, M. V.; Obraztsova, N. V.; Savchenko, E. I.

pp. 121-128 (1970) [15 ref. Ru] Minsk, USSR: Izdatel'stvo Nauka i Tekhnika Price 1.55 rouble [Otdel Mikrobiol. AN BSSR, Minsk, USSR]

A method for determination of proteolytic activity of lactic acid bacteria grown in a milk medium is described, which is based on measurement of coloured compounds formed by the interaction of liberated amino acids with Folin & Ciocalteau reagent [see Hull, J. Dairy Sci. (1947) **30** (11) 881-884]. Quantities of tyrosine + tryptophan (mg %) liberated in 72 h were 0.37-1.84 by Streptococcus thermophilus (3 strains), 0.50 by Str. paracitrovorus, 9.05 by Str. lactis, 8.75-10.0 by Str. diacetilactis (2 strains), 9.2 by Lactobacillus casei, 11.7 by L. bulgaricus, 12.48 by L. plantarum, 16.8 by L. helveticus and 18.65 by L. acidophilus. SKK

4 P 556

[Selection and use in the dairy industry of proteolytically active strains of lactic acid bacteria.] (In "Physiology and biochemistry of microorganisms".)] In "Fiziologiya i biokhimiya mikroorganizmov".

Mochalova, K. V.

pp. 129-132 (1970) [3 ref. Ru] Minsk, USSR: Izdatel'stvo Nauka i Tekhnika Price 1.55 rouble [Belorusskii Filial Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

~400 strains of Streptococcus lactis, Str. cremoris, Str. diacetilactis and Str. paracitrovorus isolated in Belorussia were examined for proteolytic activity by the method described in the preceding abstr. The strains were classified into those of high (>6 mg%), medium (3-6 mg%), and low (≤3 mg%) activity; starters were made from streptococci of the 3 different classes and carried through 10 subcultures. Cheeses made (no particulars given) using starters of high activity ripened better and had a higher organoleptic quality than those made using starters of low activity. SKK

4 P 561

Investigation of accelerated fermentative utilization of cheese whey for food and the recovery of by-products.

Bechtle, R. M.

Dissertation Abstracts International. Section B. The Sciences and Engineering **32** (4) 2219: Order no. 71-26603 (1971) [En] [St. Univ., Manhattan, Kansas 66502, USA]

Mixed cultures of 6 food yeasts and 6 starter streptococci strains were used in accelerated fermentation trials on conc. fortified cheese wheys using a critical aeration at an air flow rate of 110 ml/l./min/1% lactose, at ≤9 lb/in^2. Whey, concentrated 1-3 times, and containing up to ~22% solids with 15% lactose, was inoculated with 5% of actively growing unconcentrated whey medium shake culture previously incubated for 72 h. It was generally found that max. response was attained in 48 h, 25% longer than for conventional fermentation, giving 92-108 g dried microbial cell mass/l. as compared with 27-35 g with conventional fermentation. After concentration, dialysis and freeze-drying, the spent ferment, which contained substantial amounts of minerals and group B vitamins, consistently showed proteolytic activity; some preparations also showed milk clotting activity which was stimulated by divalent metal ions. After recovery of by-products from the spent ferment, the effluent remaining should have very low BOD on disposal. [See also FSTA (1971) **3** 11P1935 & 1936.] SAC

4 P 594
[Increasing the proteolytic activity of X-ray mutants of lactic bacteria. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Dilanyan, Z.; Makaryan, K.; Ioanisyan, T.; Sarkisyan, R.; Akopyan, A.
pp. 315-318 (1971) [7 ref. Ru] Erevan, USSR: Izdatel'stvo Aistan [Erevanskii Zoovet. Inst., Erevan, USSR]

See FSTA (1971) 3 4P604 & Dilanian [Dilanyan] et al XVIII Int. Dairy Congr. (1970) 1E : 122. SKK

4 P 600
Curd from Miltone (vegetable toned milk).
Krishnaswamy, M. A.; Patel, J. D.; Dhanaraj, S.; Govindarajan, V. S.
Journal of Food Science and Technology (Mysore) 8 (2) 41-46 (1971) [17 ref. En] [Central Food Tech. Res. Inst., Mysore, India]

Miltone, consisting of groundnut protein isolate, liquid glucose, minerals and vitamins, was used as a substitute for dried skim-milk in the manufacture of toned milk which was subsequently used to produce a curd or dahi, a popular fermented milk product, as follows: 500 ml milk was heated at 85°C for 30 min, cooled to room temp., inoculated with 1.5% (v/v) single-strain or mixed cultures and incubated for 14-16 h. Carbonation of the curd with CO_2 for 3 min prior to filling in ½ l milk bottles afforded it a satisfactory shelf-life, the curd retaining its structure and flavour during storage. Of the starter strains tested Streptococcus citrophilus produced the most acceptable curd ($P<0.05$). Curd made from cows' milk was judged to be significantly better in terms of colour, appearance, aroma and overall acceptability on organoleptic evaluation using a panel. SAC

4 P 606
[Semi-industrial scale investigation of starters for Sovetskii cheese selected according to amino acid formation. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Dilanyan, Z.; Khachatryan, V.; Ter-Kazar'yan, S.; Ioanisyan, T.
pp. 145-150 (1971) [9 ref. Ru] Erevan, USSR: Izdatel'stvo Aiastan [Erevanskii Zoovet. Inst., Erevan, USSR]

2 undefined variants (see following abstr.) of Sovetskii cheese starter and a 3rd variant composed of 3 strains of Lactobacillus helveticus, 3 of L. lactis, 2 of Streptococcus lactis, 3 of Str. diacetilactis and 3 of Str. thermophilus, and all 3 chosen on the basis of vigorous formation of free amino acids by their component strains, were tested in the manufacture in 5000-l. vats of a total of 480 experimental Sovetskii brick cheeses and 480 control cheeses made using the All-Union Butter and Cheese Industry Research Institute's starter. Yeasts were added in the manufacture of experimental cheeses before rennetting and 5-10 min before the end of curd draining, each time at the rate of 400 000-500 000 cells/ml milk. Results of caseolysis and amino-acid formation tests are presented as well as results of organoleptic scoring. Cheeses produced using the starter variants, particularly the 3 rd, received higher scores than the control cheese. SKK

4 P 607
[Effect of bacterial starters, selected according to amino acid formation, on the quality of Sovetskii cheese. (In "Proceedings of Inter-University Dairy Conference,.)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Dilanyan, Z.; Ostroumov, L.
pp. 195-198 (1971) [4 ref. Ru] Erevan, USSR: Izdatel'stvo Aiastan

Starter variant (iii) of the preceding abstr. and variants (i) and (ii) now said to consist respectively of 4 and 3 strains of Lactobacillus helveticus, 2 and 2 of L. lactis, 4 and 2 of Streptococcus lactis, 2 and 4 of Str. thermophilus, 2 and 2 of Str. bovis, 3 and 0 of L. bulgaricus and 0 and 3 of L. casei were used in the manufacture in 400-l. vats of parallel batches of Sovetskii cheese, no yeasts being used this time. Total quantities of free amino acids produced by the starters after culturing in milk for 7 days were for (i)-(iii) respectively 80.2, 118.5 and 183.7 mg/100 g; organoleptic scores of the cheeses (87, 88 and 93) increased in the same order. SKK

5 P 616
[Milk oligosaccharides.]
Grimmonprez, L.
Annales de la Nutrition et de l'Alimentation **25** (2) A39-A79 (1971) [204 ref. Fr] [Lab. de Chimie Biol., Fac. des Sciences, 59-Villeneuve d'Ascq, France]

In Part I of this review (pp. A40-A50) the isolation and physico-chemical properties of lactose and the neutral and acidic oligosaccharides of human milk are discussed. Neutral oligosaccharides, falling into 2 categories depending on the presence or absence of N-acetylglucosamine, and acidic oligosaccharides are tabulated with regard to their composition and structure; the oligosaccharides of human colostrum are compared to those found in the milk and colostrum of other mammals. Part II (pp. A50-A68) deals with lactose and oligosaccharide biosynthesis, considered in relation to nucleotides, soluble blood group substances, glycoproteins and gangliosides and Part III (pp. A69-A71) covers reasons for the growth of Lactobacillus bifidus in human milk due to bifidus factors which are absent in cows' milk. A discussion (pp. A76-A79) is included. SAC

5 P 646
[Microbiologicai investigation of fermented milk drinks. Gas cromatography of the fatty acids in yoghurt.]
Formisano, M.; Percuoco, G.; Percuoco, S.
Industrie Agrarie **9** (7/8) 273-277 (1971) [7 ref. It, en] [Istituto di Microbiol. agraria, Univ., Naples, Italy]

The esterified and free fatty acid constituents of 5-day and 20-day old yoghurts ripened by Streptococcus thermophilus, Lactobacillus bulgaricus and 60:40 mixtures of the 2 were investigated by GLC. Esterified acid distributions approximated to that of the original milk, but free fatty acid distributions differed greatly therefrom and were influenced both by the organism used and the age of the product. The Str. thermophilus preparation possessed high $C_{12}/C_{12:1}$, $C_{14}/C_{14:1}$ and $C_{16}/C_{16:1}$ fatty acid ratios, while the L. bulgaricus and mixed preparations had low ratios; the converse held for C_8/C_6. With increased age of product the proportion of lower acids (up to C_{14}) in the Str. thermophilus and mixed yoghurts rose. Chromatograms of milk fermented with any 1 of the 3 cultures showed a marked C_4 peak and peaks of 4 acids not present in the original milk fat. GTP

5 P 655
[Selection of lactobacilli for cheese starters. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Dilanyan, Z.; Ter-Kazar'yan, S.
pp. 335-338 (1971) [7 ref. Ru] Erevan, USSR: Izdatel'stvo Aiastan [Erevanskii Zoovet. Inst., Erevan, USSR]

See FSTA (1971) **3** 4P672.

5 P 656
[Lipolytic activity of lactobacilli isolated from different cheeses. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Lentsner, A.; Lentsner, Kh.; Toom, M.; Vel'dre, S.
pp. 151-154 (1971) [10 ref. Ru] Erevan, USSR: Izdatel'stvo Aiastan [Tartuskii Gosudarstvennyi Univ. Estonskoi SSR, Tartu, USSR]

2 strains of Lactobacillus helveticus, 11 of L. jugurti, 100 of L. casei var. casei, 25 of L. casei var. rhamnosus, 5 of L. plantarum, 15 of L. buchneri and 1 of L. brevis were isolated, using methods described previously [Prikl. Biokhim. Mikrobiol. (1968) **4** (1) 76-81 & Lab. Delo **1967** (5) 301-302], from 18 samples of 1-, 2-, and 4-month old Estonskii cheese and from 3 samples each of 1.5-month old Dutch-type brick and Kostroma cheeses. 129 of the total of 159 strains isolated showed lipolytic activity, determined as described previously [Moloch. Prom. (1967) **28** (4) 25-27]; these comprised 7 strains of L. jugurti, 87 of L. casei var. casei, 23 of L. casei var. rhamnosus, 3 of L. plantarum and 9 of L. buchneri. There were no substantial differences in lipolytic activities of the lactobacilli of the 3 types of cheese. SKK

5 P 662
[Characteristics of microbiological and biochemical processes in Ukrainskii cheese. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Genich, G.
pp. 219-223 (1971) [5 ref. Ru] Erevan, USSR: Izdatel'stvo Aiastan [Ukrainskii Nauchno-issled. Inst. Maysnoi i Molochnoi Promyshlennosti, USSR]

Ukrainskii cheeses were manufactured as described previously [see FSTA (1971) **3** 2P434] using 3 starters consisting of (i) 1% Streptococcus thermophilus, (ii) 0.5% Str. thermophilus + 0.5% mesophilic cultures (from soft cheese starters) and (iii) 1% mesophilic cultures. Apart from the starter, Lactobacillus helveticus culture (0.05%) + 10 million propionic acid bacteria/1000 l. were added to the milk. (i) produced the most intensive lactic acid fermentation, total lactic acid bacteria counts (millions/g) and the % which were lactic streptococci respectively being as follows: after pasteurization, 0.1 and not stated; 1-day cheese, 3703.7 and 99.9; 3-day cheese, 700.4 and 99.4; 30-day cheese (during ripening at 20-22°C), 707.0 and 52.3; 60-day cheese, 347.7 and 98.9; and 180-day cheese, 101.0 and 99.0. Data on extent of proteolysis in cheeses made with (i) after pressing and at 30 and 60 days of age respectively include: soluble proteins as % of total protein, 3.4, 20.7 and 21.3; non-protein N as % of total N, 1.9, 10.8 and 13.1. Total organoleptic scores of ripe cheeses made with (i)-(iii) respectively were 93.1, 88.5 and 88.6 points. SKK

5 P 690
Chemical nature of malty flavour and aroma produced by Streptococcus lactis var. maltigenes.
Sheldon, R. M.; Lindsay, R. C.; Libbey, L. M.; Morgan, M. E.
Applied Microbiology **22** (3) 263-266 (1971) [11 ref. En] [Dept. of Food Sci. and Tech., St. Univ., Corvallis, Oregon 97331, USA]

Mature skim-milk cultures of Str. lactis var. maltigenes were steam-distilled at low temp. under reduced pressure. Ethyl ether extracts were prepared from the distillates and analysed by GLC and mass spectrometry. 20 of 31 components detected in the culture distillates were identified positively and 11 tentatively, whereas 10 of 19 components detected in the heated skim-milk control were identified positively and 9 tentatively. Among components detected in the culture distillate,but not detected in the heated skim-milk distillate, and which have not been previously identified in milk cultures of the organism, were phenylacetaldehyde and phenethanol. Quantitative analyses of the volatile components entrained from milk cultures of several strains of Str. lactis var. maltigenes revealed a probable relationship between variation in the character of the aroma of the cultures and the alcohol/aldehyde ratio. AS

5 P 700
Enumeration and viability of *L.* bulgaricus and Str. thermophilus in yoghurts.
Davis, J. G.; Ashton, T. R.; McCaskill, M.
Dairy Industries **36** (10) 569-573 (1971) [22 ref. En]

A method developed for separate enumeration of Streptococcus thermophilus and Lactobacillus bulgaricus involved growing both organisms in LAB medium (containing lactose, tryptone, meat extract, yeast autolysate, tomato juice, Tween 80, K_2HPO_4 and agar) using the double pour plate technique, and differentiating by colony type under a low power binocular microscope. Str. thermophilus formed smooth, round or lenticular colonies and L. bulgaricus formed irregular or rough colonies in the depth of the medium. Viable bacteria in the yoghurt were estimated from microscopic counts based on the general consideration that Gram-positive organisms lose their Gram-positive property as they die off. From results of tests on yoghurt, using LAB medium for streptocci and lactobacilli, citric acid agar for yeasts and moulds, and McConkey broth for coliforms, it is concluded that reasonable microbiological standards for classifying yoghurt as satisfactory, doubtful and unsatisfactory respectively, at the point of sale would be [units not stated]: Str. thermophilus and L. bulgaricus, each $>10^8$, 10^7-10^8 and $<10^7$; coliforms, <1, 1-10 and >10; yeasts (natural yoghurt) <10, 10-100 and >100, (fruit yoghurt) <100, 100-1000 and >1000; and moulds, <1, 1-10 and >10. CDA

5 P 705
[Effect of major microflora components of tvorog and cream starters on multiplication of citrate-positive coliform bacteria.]
Sukhova, T. S.
Molochnaya Promyshlennost' **32** (12) 5-7 (1971) [4 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

2 tvorog and smetana starters with predominance of Streptococcus lactis, 1 with predominance of Str. cremoris and 3 containing similar proportions of both microorganisms were found to inhibit Escherichia coli strongly but inhibited Aerobacter aerogenes only to a limited extent; and in the first few h of joint culturing with starters, the growth of Aerobacter was even stimulated. A type collection strain of Citrobacter freudii and 3 strains isolated during commercial tvorog manufacture were all inhibited in joint culturing with the starters; no clear correlation was found between degree of inhibition and starter composition. SKK

5 P 720
Stimulation of the rate of acid production by lactobacilli in media containing a capsular substance from micrococci.
Nath, K. R.; Ledford, R. A.
Journal of Dairy Science **54** (12) 1784-1789 (1971) [40 ref. En] [Dept. of Food Sci., Cornell Univ., Ithaca, New York 14850, USA]

Capsular material from micrococci of Cheddar cheese origin stimulated acid production in milk by 13 of 14 Lactobacillus strains also of Cheddar cheese origin. The capsular material contained 8% N acetylhexosamine, 0.24% sialic acid and 6.8% boun carbohydrate; the stimulatory factor was heat stable. Capsular preparations (1 mg/ml) from 18 micrococci isolated from the same Cheddar cheese stimulated acid production of a Lactobacillus isolate by 14.3-31.4% after 41 h. They also stimulated acid production of Streptococcus thermophilus by 33.3% after 5.5 h at 45°C, and of Str. lactis var. maltigenes, Str. lactis 2 and Str. cremoris by 55.1, 54.8 and 52.8%, respectively, afte 6 h at 30°C. Results are discussed in relation to cheese ripening. CDA

5 P 759
Diacetyl and acetoin production by Lactobacillus casei.
Branen, A. L.; Keenan, T. W.
Applied Microbiology **22** (4) 517-521 (1971) [17 ref. En] [Food Sci. Inst., Purdue Univ., Lafayette, Indiana 47907, USA]

Agitation of broth [Difco Elliker] cultures of L. casei retarded cellular dry wt. accumulation but enhanced production of both diacetyl and acetoin. Addition of pyruvate overcame this retardation, but addition of sulphydryl-protecting reagents did not. Both pyruvate and citrate enhanced accumulated dry wt. of L. casei incubated without agitation, but only pyruvate increased diacetyl accumulation. Both actively-dividing cells and cells suspended in buffer converted pyruvate to diacetyl and acetoin. Max. production of diacetyl and acetoin occured during the late logarithmic or early stationary phases. Cells isolated from pyruvate- or citrate-containing cultures showed the greatest ability to convert pyruvate to diacetyl and acetoin. The optimum pH for diacetyl and acetoin formation by whole cells was in the range of 4.5 to 5.5. The presence of citrate or acetate enhanced diacetyl and acetoin formation by L. casei cells in buffer suspension. [See also FSTA (1971) **3** 6P967; 5P754 & J. Dairy Sci. (1970) **53** (5) 593-597.] AS

5 P 802
[Influence of the storage period before coagulation on the properties and composition of lactic curds obtained from concentrated milk.]
Tarodo de la Fuente, B.; Turk, S.; Alais, C.; Hutin, G.; Bruneau, J. C.
Lait **51** (509/510) 623-637 (1971) [11 ref. Fr, en] [Ecole Superieure de Laiterie (ENSAIA), 28 bis, Rue Ste-Catherine, 54 Nancy, France]

The composition and properties of acid curds obtained by the continuous coagulation of concentrated skim-milk depended largely on the method of acidification; curds from milk acidified to pH 4.7 at 5°C with HCl contained more TS than curd acidified using 'Flora Danica' lactic cultures (176 vs. 128 g/kg curd), more bound Ca (3.2 vs. 2.5 mg/g protein sedimented at 68 000 × **g** for 35 min at 37°C) and less lactose (22.8 vs. 31.2% of TS). Chemically acidified curd was firmer but the curd yield lower; the addition of Ca to the milk had no significant effect on curd composition. Increasing the holding time at 12°C, prior to acidification, from 2 to 5 h decreased TS content and firmness of both curds; curd firmness was found to be correlated to the whey solids content of the curd. SAC

5 P 797
[Influence of yoghurt microorganisms on contents of nitrogenous substances.]
Luca, C.
Industria Alimentara **21** (11) 633-637 (1970) [13 ref. Ro] [Inst. Politehnic, Galati, Roumania]

(i) Lactobacillus bulgaricus, (ii) Streptococcus thermophilus and (iii) a mixture of the 2 were cultured in sterilized skim-milk for up to 30 days at 40°C and contents of total N, protein N, amino-acid N and ammonia N and titratable acidity were measured at intervals. It is concluded from the tabulated results that the main proteolytic activity took place in the first 24-36 h, when the protein N decreased by (i) 23.8, (ii) 23.4 and (iii) 36.8 mg%. After 6 days incubation of (i), protein N had decreased by 35.1 mg%, whereas with (ii) it had only decreased by 24.2 mg% after 20 days; with (iii) it decreased by 42.2 mg% after 30 days. SKK

6 P 820
[Application of the method of luminescing antibodies for the identification of lactobacilli. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu". Afanas'eva, O.; Kazanskaya, L.; Zubzhitskii, Yu. pp. 429-431 (1971) [10 ref. Ru] Erevan, USSR: Izdatel'stvo Aiastan [Leningradskoe Otdelenie Vses. Nauchno-issled. Inst. Khlebopekarnoi Promyshlennosti, Leningrad, USSR]

See FSTA (1971) **3** 1B5.

6 P 821
[Effect of residues of disinfectant in milk on activity of several species of lactic streptococci.]
Kerherve, L.; Richard, J.
Revue Laitiere Francaise **1971** (291) 717, 720-721, 723 & 725-726 (1971) [14 ref. Fr] [Lab. de Recherches de Tech. Laitiere, INRA, Rennes, France]

The effects were determined of (i) H_2O_2, (ii) Tego 51, (iii) and (iv) 2 iodophors, (v) and (vi) 2 quaternary ammonium compounds, and (vii)-(x) 4 chlorine-based disinfectants, each at 1-100 ppm active substance, on acid production by Streptococcus cremoris, Str. diacetilactis, Str. lactis and Str. thermophilus. The effects generally had a greater effect on the 3 mesophilic Streptococcus spp. than on Str. thermophilus. Levels of active substance (ppm) required to reduce by ≥2°Dornic the acid production by the mesophilic streptococci and by Str. thermophilus respectively were: (i) 1 and 1-5; (ii) 1-10 and 25; (iii) 1-5 and 5-10; (iv) 10-25 and 10-25; (v) 1-5 and 10-25; (vi) 1-10 and 50-100; (vii) 10-25 and 10-25; (viii) 5-25 and 10; (ix) 25-50 and 50-100; and (x) 10-25 and 50-100. Corresponding concn. producing total inhibition were as follows: (i) 25-50 and 50-100; (ii) ≥100 and 100; (iii) 25-50 and 50-100; (iv) 50 and 25-50; (v) 50-100 and >100; and (vi)-(x) all >100 and >100. The results are discussed in relation to returdation of the activity of lactic acid bacteria in milk. CDA

6 P 889
Growth studies on the lactic streptococci. I. A laboratory apparatus suitable for fermentation studies using skim-milk medium.
Keen, A. R.
Journal of Dairy Research **39** (1) 133-140 (1972) [11 ref. En] [Dairy Res. Inst., Palmerston North, New Zealand]

6 P 890
Growth studies on the lactic streptococci. II. The effect of agitation on the growth characteristics of Streptococcus lactis ML_8 in batch culture.
Keen, A. R.
Journal of Dairy Research **39** (1) 141-150 (1972) [22 ref. En]

6 P 891
Growth studies on the lactic streptococci. III. Observations on continuous growth behaviour in reconstituted skim-milk.
Keen, A. R.
Journal of Dairy Research **39** (1) 151-159 (1972) [26 ref. En]

6 P 892
Growth studies on the lactic streptococci. IV. Some observations on redox potential.
Keen, A. R.
Journal of Dairy Research **39** (1) 161-165 (1972) [12 ref. En]

6 P 893
Associative growth relationships in two strain mixtures of Streptococcus lactis and Streptococcus cremoris.
Reddy, M. S.; Vedamuthu, E. R.; Washam, C. J.; Reinbold, G. W.
Journal of Milk and Food Technology 13 ref. (1971) [En] [Dept. of Food Tech., St. Univ., Ames, Iowa 50010, USA]

The interactions between 4 strains of Streptococcus cremoris (HP, ML4, 1 and DR7) and 4 of Str. lactis (C2, E, 10 and 7963), inoculated in pairs into a single milk-containing medium [See Appl. Microbiol. (1969) **18** (5) 755-759] were investigated. Subcultures of different combinations of 2-strain mixed cultures revealed that Str. cremoris ML4 and DR7 became numerically dominant over the 4 Str. lactis strains, Str. cremoris 1 was compatible with all Str. lactis strains and Str. cremoris HP was suppressed by all the Str. lactis strains. These associative growth patterns were similar at 21° and 32°C irrespective of the initial cell numbers of the component strains. MJL

6 P 894
Pyrrolidone carboxylyl peptidase activity in bitter and non-bitter strains of Streptococcus cremoris.
Exterkate, F. A.; Stadhouders, J.
Netherlands Milk and Dairy Journal **25** (4) 240-245 (1971) [22 ref. En, nl] [Netherlands Inst. for Dairy Res. (NIZO), Ede, The Netherlands]

Intact cells and cell-free extracts of bitter and non-bitter strains of Str. cremoris were assayed for pyrrolidone carboxylyl peptidase (PCP) using pyrrolidone carboxylyl-β-naphthylamine as substrate. Considerable loss of PCP-activity accompanied the preparation of the cell-free extracts. Recoverable activity was located in the cytoplasm rather than the membrane fraction. Intact cell, and cell-free PCP activities were higher in bitter than in non-bitter strains. PCP was most active at pH 9.2 and inactive at pH 5.0. The results presented do not support the proposed model for bitterness formation [See FSTA (1971) **3** 1P215], which is based on the inability of bitter strains to hydrolyse peptides containing pyrrolidone carboxylyl residues. BAL

6 P 895
[The influence of the bacterial flora of mixed milk as affected by storage temperature and inoculation with lactic acid bacteria.] Die Beeinflussung der Bakterienflora von Mischmilchen durch Lagerungstemperatur und Beimpfung mit Milchsäurebakterien.
Oehen, V.; Thürlemann, P.
Schweizerische Milchzeitung **97** (67) 521-522 (1971) [De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld-Berne, Switzerland]

Practical experience indicates that the bacterial flora of cheese milk should be within certain limits: $<5 \times 10^5$ viable bacteria/ml; $<10^4$ staphylococci/ml; $\geq 10^5$ lactic acid bacteria/ml; and $<10^3$ coliforms/ml. Some of the milk used for the production of hard cheese is of such high hygienic quality that it contains insufficient lactic acid bacteria. The balance of the bacterial flora could not be redressed by incubation at 8-22°C for 12-24 h because the staphylococci increased at about the same rate as the lactic acid bacteria and the coliforms became dominant. Inoculation with thermophilic lactic acid streptococci prior to cheesemaking redressed the imbalance of the bacterial flora in favour of the lactic acid bacteria and is, therefore, recommended as a practical measure. BR

6 P 927
[Suitability for cheesemaking and biological value of milk during prolonged feeding of cows with rations rich in maize silage. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dolkadov mezhvuzovskoi konferentsii po molochnomu delu".
Abramova, O.; Buldakova, M.
pp. 65-68 (1971) [6 ref. Ru] Erevan, USSR: Izdatel'stvo Aiastan

Results of a study with 2 groups of Red Steppe cows, extending over 485 days, showed that prolonged feeding with maize silage at a rate of 37-40 kg/head/day did not influence adversely the suitability of milk for cheesemaking. In the winter period, milk of the experimental and control groups of the cows equally supported the growth of lactic acid bacteria. In the summer period milk of cows that were getting in their ration 60% of maize silage (on the basis of nutritional value) did not support the growth of the lactic acid bacteria as well as the milk of the cows that were fed green forage. ASL

6 P 933
[Shelf-souring, dried milk products inoculated with microorganisms.] Mit Mikroorganismen vorbeimpfte und selbstsäuernde Trockenmilcherzeugnisse.
Schuler, R.; Hinterwaldner, R.
West German Patent Application 1 949 886 (1971) [De]

Pasteurized or sterilized milk is inoculated with cultures of e.g. Streptococcus lactis, Str. cremoris, Str. thermophilus, Lactobacillus bulgaricus, L. lactis, L. casei or L. bifidus. The milk is then dried at <50°C or freeze-dried, so that the activity of the culture is not impaired when reconstituting the dried product. If a cultured milk product is required, the reconstitution temp. is 10-50°C. For more rapid culture reactivation, yeast extracts or autolysates are added as growth activators. Before or after drying, flavouring, e.g. fruit, coffee or tea, can be added in extract or powdered form. W&Co

6 P 936
[Fermented milk drink.]
Hida, M.
Japanese Patent 17/72 (1972) [Ja]

An animal milk base containing divalent Mn and Sn ions is cultured with a lactic acid bacillus, after which it is combined with sweeteners and flavouring agents to yield a fermented acid milk dirnk. IFT

6 P 967
Process for preparing lactic spread.
Cox, C. J.; Hepburn, J. J. (Unilever Ltd.)
British Patent 1 261 910 (1972) [En]

In 1 of 7 examples of the application of the invention, spray-dried skim-milk (10 parts) is dispersed in 40.25 parts of water, the product heated to 50°C, 43.5 parts of molten unsalted New Zealand butter added, the mixture is pasteurized at 80°C with 20 sec holding, homogenized at 65°C and 1500 lb/in^2, cooled to 45°C and inoculated with a starter (5 parts) of Lactobacillus bulgaricus and Streptococcus thermophilus (ratio 1:1). The mixture is incubated at 44°C to pH 5.2, which takes ~2½h, common salt solution and suitable flavour are added, and, after stirring, the mixture is cooled rapidly to ~25°C (pH~5.0). The product is then repasteurized, cooled and worked in a refrigerated scraped-surface tubular cooler (extrusion temp. 45°C), filled into small tubs and frozen by air blast to -27°C. The products have improved freeze-thaw stability and texture. FL

6 P 971

[Preparation of new pure cultures of bacteria isolated from natural environment for manufacture of Swiss-type cheese. II. Use of new pure bacterial cultures for production of Emmental cheese and of a new kind of Swiss-type cheese.]

Bijok, F.

Roczniki Instytutu Przemyslu Mleczarskiego **13** (1) 35-57 (1971) [8 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

A new kind of block Swiss-type cheese was prepared using as starter (i) a 1:1:1 mixture of strains of Streptococcus thermophilus, Lactobacillus helveticus and L. casei of Hungarian origin, (ii) similar mixtures of strains of Swiss origin described in part I [FSTA (1972) **4** 4P448] or (iii) starter (ii) + a standard culture of L. casei var. thermophilus (mixture:L. casei ratio 2:1). Milk standardized to yield cheese with 45% fat in DM was pasteurized at 71-72°C for 11-19 sec or at 63-65°C for 30 min, renneted at 33°C for ~30 min and 0.25% starter was added; the coagulum was cut to wheat-grain size, left in the whey for ~45 min, scalded at 51°C for 10-15 min, prepressed, formed into 10-kg blocks, pressed for 6 h, brined for 24 h at 12-14°C in 18-20% brine and ripened for $3\frac{1}{2}$-$4\frac{1}{2}$ months at 14-16°C and 90% RH. The cheeses had few and small eyes and a sweet, nutty flavour typical of Emmental cheese. Those made with starters containing L. casei var. thermophilus were particularly successful. SKK

7 P 1020

[An attempt to improve the resazurin test for estimating the bacteriological quality of milk.]

Feuillat, M.; Perrot, C.; Vieudrin, C.

Lait **51** (508) 545-558 (1971) [2 ref. Fr, en] [Lab. de Chimie et de Technol. Agricole, ENITA, Dijon-Quetigny, France]

A photometric resazurin method is described in which 5 ml milk + 0.5 ml ethanolic resazurin solution (50 mg active substance/l. are incubated at 37-38°C in a waterbath in the dark; after 15, 30, 45, 60 or 90 min, the milk is saturated with $NaHCO_3$ and extracted with $NaHCO_3$-saturated butanol, and resazurin (oxidized form) is read spectrophotometrically at 615 nm and resorufin (reduced form) at 585 nm. The method permits calculation of optical densities of the colours that develop during reduction, calibration of resazurin solutions, and correction of readings by means of a standard. The method could be used to determine the activity of mesophilic lactic acid bacteria in the control of milk fermentation or cheese starter activity before and during production. For the industrial grading of milk, the photometric method showed closer agreement with bacterial count than did the visual resazurin method. CDA

7 P 1034

Factors affecting the reproduction and preservation of lactic acid bacteria. [A book]

Klaar, J.

49pp. (1971) [En] Tallinn, Estonian SSR: Min. of the Meat & Milk Ind.

The author deals mainly with chemical and physical factors affecting the propagation of lactic streptococci and lactobacilli in starters and cultured milk products, effects of inhibitory substances, activation of starters in the manufacture of Edam and Gouda cheeses, and control of microbiological processes in butter and silage. FL

7 P 1035

[Enumeration, differentiation and isolation of lactic acid bacteria from yoghurt.]

Ottogalli, G.; Galli, A.; Ferrari, A.

Latte **44** (11) 797-801 (1970) [7 ref. It, en]

A variety of media were used for the examination of the microflora of 15 samples of yoghurt. Anaerobic incubation was generally more satisfactory than aerobic incubation. For the total count, whey/caseinate/agar medium [Annali Microbiol. (1967) **17** (4/6) 135-145] was better than the whey/agar medium of Rossi & Corberi. Total counts of up to 7×10^8/ml were found. For differential counting, whey/$CaCO_3$/agar medium and a sterilized milk medium were recommended; the Lactobacillus bulgaricus colonies had frayed edges while the Streptococcus thermophilus colonies were lenticular. For the isolation of bulgaricus, Trypsin Digest Agar (Difco) and Micro Assay Culture Agar (Difco) were recommended but not acetate agar [Rogosa et al., J. dent. Res. (1951) **30**: 682] or the medium of de Man et al. [J. appl. Bact. (1960) **23** (1) 130-135]. For the isolation of Str. thermophilus, Tryptic Soy Agar (Difco) was recommended. JMD

7 P 1038
Cheese starters under control.
Lawrence, R. C.; Pearce, L. E.
Dairy Industries **37** (2) 73-78 (1972) [22 ref. En]
[Dairy Res. Inst., Palmerston North, New Zealand]

Trials in New Zealand with single strain starters have shown that certain strains of Streptococcus cremoris (AM1, AM2 and E8) produce acid relatively slowly, but give consistently good-flavoured Cheddar cheese and support only low specific bateriophage levels. Other starter strains which are faster acid producers support higher phage levels and gave poor quality cheese susceptible to off-flavour development. By pairing slow and fast starters in the ratio of 2:1 it is possible to make good quality cheese commercially in a highly predictable time which is only minutes longer than that characteristic of the faster starter alone. Specific phage levels to the faster strain are reduced by the reduction in the numbers of susceptible cells. 4-day rotations of starter pairs are successful provided that individual strains are checked for phage interrelationships, and that suitable aseptic and sanitizing precautions are taken in the factory. [See also FSTA (1972) **4** 2P255]. BAL

7 P 1039
[Rapid method for the study of lipases of foods and of microorganisms.]
Carini, S.; Gregori, A. de
Latte **44** (7) 486-488 (1970) [5 ref. It, en]
[Istituto Industrie Agrarie, Univ. di Milano, Italy]

Lipase activity was estimated from the size of the coloured zone, produced around holes containing the lipase extract, in an agar gel containing Fast Blue BB and a naphthyl ester, after incubation for 16 h at 30°C. Extracts for Grana, Cresenza and Emmental cheese gave similar lipase activity against the acetate, laurate, myristate, palmitate or stearate ester, but Gorgonzola extract was not able to hydrolyse significantly the naphthyl myristate or stearate. The method was also tested successfully on extracts of Lactobacillus lactis cultures. JMD

7 P 1041
[The control of late blowing in hard cheese.] Zur Bekämpfung der Spätblähung bei Hartkäsen auf biologischem Wege.
Kundrat, W.
Alimenta **10** (4) 133-141; (5) 167-180 (1971) [290 ref. De]

The importance of Clostridium tyrobutyricum and Cl. sporogenes as the cause of blowing in hard cheese is reviewed. The suitability of several approved media and >200 experimental media for enumeration of Cl tyrobutyricum was tested and a complex medium including $MnSO_4$, RNA and resazurin was selected; in tests involving 187 strains of Cl. tyrobutyricum and standard strains of other Clostridium spp., only Cl. tyrobutyricum formed typical colonies at 37°C on this medium. Physical, chemical and biological methods for preventing blowing are extensively reviewed. Investigations of the effect of various microorganisms on the growth of Cl. tyrobutyricum showed that species most frequently used in Emmental cheesemaking (Streptococcus thermophilus, Lactobacillus helveticus and Propionibacterium shermannii) promoted its growth. However, 9 strains of L. helveticus from Scandinavian milk products, 3 from African calabash milk and 1 from kefir, strains of Str. thermophilus from unusual sources (e.g. moss) and 3 strains of L. casei var. rhamnosus inhibited growth of Cl. tyrobutyricum. From these strains, 8 new starters have been developed, 1 of which has been in commercial use for 10 yr; during this period no Cl. tyrobutyricum has been found. Only 1 strain of Propionibact. shermannii has been found which is not stimulatory to Cl. tyrobutyricum; good development of holes has been obtained in cheeses made with this strain. FWJ

7 P 1043
Manufacture of blue-veined cheese.
Williamson, W. T.; Purko, M. (Kraftco Corp.)
United States Patent 3 635 734 (1972) [En]

It is claimed that blue-veined cheese with improved mould distribution may be obtained by adding to the cheese milk, in addition to the ordinary starter culture, a vigorously gas-producing culture of Streptococcus diacetilactis. The specification covers the propagation and maintenance of vigorous gas-producing cultures of Str. diacetilactis for this purpose. EJM

7 P 1097
[Microbial flora of Greek kefir.]
Georgantas, S.
***Latte* 44** (8) 568-570 (1970) [36 ref. It, en]
[Inst. of Agric. Tech., Univ., Thessalonika, Greece]

Commercial samples of Greek kefir, which contained ~0.8% ethanol, ~0.9% lactic acid and ~2.7% carbohydrate, were examined. Yeasts, isolated after enrichment, were identified biochemically and morphologically as Saccharomyces cerevisiae var. ellipsoideus and Sacch. italicus. The lactobacilli were present at ~3.4 × 10^8/ml; they resembled Lactobacillus acidophilus but did not ferment cellobiose, amygdalin or salicin, and resembled L. bulgaricus but were able to grow in the presence of 2% NaCl. The few streptococci isolated were Streptococcus lactis or Str. thermophilus. JMD

7 P 1104
The plating efficiency of bacteriophages of lactic streptococci.
Lowrie, R. J.; Pearce, L. E.
***New Zealand Journal of Dairy Science and Technology* 6** (4) 166-171 (1971) [18 ref. En]
[Dairy Res. Inst., Palmerston North New Zealand]

Plating efficiency of lactic streptococcal bacteriophages was influenced by both medium and availability of Ca^{2+} ions. The medium which gave the most satisfactory growth of 20 Streptococcus cremoris and 9 Str. lactis cheese starter strains was medium M16, which had the following composition: 0.5% beef extract, 0.25% yeast extract, 0.5% Polypeptone, 0.5% Phytone (hydrolysed plant protein), 0.05% ascorbic acid, 0.3% sodium acetate trihydrate, and 1% agar for places or 0.45% agar for overlayering; autoclaved lactose or dextrose was added after autoclaving to a final concn. of 0.5%. Highest phage titres for 6 homologous phage/host systems were obtained on M16 agar supplemented with 0.005M calcium borogluconate; Str. lactis phages were less affected by plating medium than were Str. cremoris phages. Host-modified ml_3/KH phage gave identical increased response to supplementary Ca^{2+} when plated on Str. cremoris KH and Str. lactis ML_3 hosts; the increase was characteristic of ml_3 rather than kh phage, suggesting that Ca-requirement is phage- rather than host-dependent. Ca^{2+}-supplemented M16 medium is recommended for routine assay of phages active against cheese starter streptococci. CDA

7 P 1105
Use of indicator strains for the assay of bacteriophages of lactic streptococci.
Lowrie, R. J.; Pearce, L. E.
***New Zealand Journal of Dairy Science and Technology* 6** (4) 192 (1971) [2 ref. En]

Neither Streptococcus cremoris AM_1 nor AM_2 grows well on media used for assaying their bacteriophages [see preceding abstr.], whereas both phages (am_1 and am_2) attack Str. cremoris US_3 with high efficiency. The relative efficiency of plating compared with tube assays for the 2 phages on their homologous hosts and on Str. cremoris US_3 respectively were: am_1, 21 and 63%; am_2, 51 and 64%; and efficiency of us_3 on Str. cremoris US_3 was 67%. Tube assay titre of am_1 on US_3 was ~2 × that on its homologus host, but tube assay titre of am_2 was the same with both hosts. The use of indicator strains for enumeration of cheese starter bacteriophages is discussed. CDA

8 P 1139
Ecology of the lactic streptococci. A review.
Sandine, W. E.; Radich, P. C.; Elliker, P. R.
***Journal of Milk and Food Technology* 35** (3) 176-185 (1972) [74 ref. En] [Dept. of Microbiol, Oregon St. Univ., Corvallis, 97331, USA]

8 P 1142
[Preparation of cultures from reconstituted skim-milk.] Kulturenherstellung aus rekonstituiertem Magermilchpulver.
Busch Johannsen, G.
***Deutsche Milchwirtschaft* 23** (4) 102-104 & 106 (1972) [De] [Lab. Wiesby, Niebüll, German Federal Republic]

3 types of dried skim-milk preparation, VIS-START I, II and III, developed in the Wiesby laboratory, and said respectively to promote growth of Leuconostoc citrovorum and Streptococcus diacetilactis; to prevent and remove bacteriophage infection; and to be suitable for cultures cold-stored or frozen for 4-10 days, are recommended as additions to liquid skim-milk for the preparation of starter cultures. It is considered that skim-milk for culturing should contain 11% TS, and an addition of 0.15-0.2% citric acid or sodium citrate is recommended to promote aroma production. Recipes for adding the VIS-START preparations and/or dried skim-milk to liquid skim-milk containing 9.2% TS are given as well as general guidelines on starter culture preparation. SKK

8 P 1149
[Intensification of cultivation of lactic acid bacteria.]
Poznanski, S.; Kornacki, K.; Rymaszewski, J.; Grochal, A.
Przemysl Spozywczy **26** (2) 64-67 (1972) [20 ref. Pl, ru, fr, de, en] [WSR, Olsztyn, Poland]

To study the effect on bacterial growth of continuous removal of inhibitory metabolites such as lactic acid, a fermenter was constructed in which the culture was circulated, by means of a metering pump, through an ion exchange column charged with strongly basic Wofatat-SBW anionite (150-200 mesh). Streptococcus lactis T, and component strains of a buffer starter were cultured at 30°C using the modified medium of Valles & Mocquot [see Rymaszavski et al., FSTA (1971) **3** 9P1489], and maintaining pH at 6.0-6.5. At the end of the logarithmic growth phase, Str. lactis count averaged 4-6 × 10^{11}/ml vs. 4-6 × 10^{10}/ml in control cultures where pH was controlled by addition of 27% ammonia solution [see FSTA (1970) **2** 1P137]. Yields of the butter starter strains were lower than those of Str. lactic but were again higher in experimental than in control cultures. SKK

8 P 1151
[Effect of milk treatment, type of starter and ripening temperature on Rossiiskii cheese quality.]
Shapovalov, N. M.; Babeshko, G. A.; Semenova, E. P.; Ovcharova, G. P.; Doil'nitsyn, G. V.
Molochnaya Promyshlennost' **33** (4) 22-25 (1972) [Ru] [Volgogradskoe Upravlenie po Zagotovkam Moloka i Molochnoi Promyshlennosti, Volgograd, USSR]

In a collaborative experiment by the (i) Tikhoretsk and (ii) Leningrad dairy factory groups, 99 batches of Rossiiskii cheese were made in (i) and 138 were made in (ii), part of the cheeses in each place being made by (i) workers and part by (ii) workers, each team using its customary technique, but testing different variants of it. The 237 batches of cheese were taken to (i) where each was ripened under 4 different temp. conditions; the 948 ripe cheeses were then assessed by an expert panel in blind tests. The results were considered in Jan. 1970 at a specialists' seminar which recommended the following manufacturing procedure for Rossiiskii cheese based on (ii) practice: clarification of cheese milk, cooling to 8-10°C, storing, preheating and 2nd clarification, pasteurization, deodorization, cooling, coagulation using in autumn and winter the Uglich (VNIIMS) starter (Streptococcus lactis, Str. cremoris, Str. acetoinicus, Str. paracitrovorus and Str. diacetilactis) and in summer also the Estonian (Tallin) starter (Str. lactis, Str. cremoris, Str. paracitrovorus and, occasionally, Str. diacetilactis) and ripening at 9-10°C and 75-80% RH. SKK

8 P 1189
Spray dried milk of the Sakha plant. II. Identification of predominating microorganisms.
Naguib, K.; Abd-el-Ghani, S.; Taha, S. M.
Journal of Milk and Food Technology **35** (1) 45-48 (1972) [23 ref. En]

296 bacterial strains isolated at 30°C from 35 samples of spray-dried milk had the following % distribution: streptococci, 67.2; micrococci, 19.6; microbacteria, 7.4; sporeforming bacilli, 3.4; other organisms, 2.4. Corresponding values for 302 strains isolated at 37°C were 72.9, 12.9, 8.9, 5.3 and 0%. The streptococci comprised ~60% enterococci, ~35% viridans group and ~5% lactic group. The micrococci were mainly Micrococcus spp. with a few group D staphylococci and intermediate group strains. 180 strains of coli-aerogenes organisms were also isolated; all were non-thermoduric Escherichia coli type 1. CDA

8 P 1192
Biochemical changes produced in milk selected cultures of lactic acid bacteria.
Dutta, S. M.; Kuila, R. K.; Ranganathan, B.; Laxminarayana, H.
Indian Journal of Dairy Science **[24]** (3) 107-114 (1971) [14 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

Streptococcus cremoris (C_1, R_6, KH and HP), Str. lactis (C_2, C_{10}, 9_1 and HS1), Str. diacetilactis (DRC-1, DRC-2 and DRC-3), Leuconostoc citrovorum 543 and Leuc. dextranicum 551 were cultured in skim-milk at 30°C and Lactobacillus acidophilus, L. bulgaricus, Str. thermophilus HSt and Str. faecalis S-30 at 37°C; all were tested after 24, 48 and 72 h for acid production and flavour development. Only Str. diacetilactic produced acetylmethylcarbinol, and only Leuc. citrovorum exhibited appreciable proteolytic activity (0.79 and 1.44 mg tyrosine liberated/g curd after 24 and 72 h respectively.) None of the cultures produced an off-flavour; Str. diacetilactis, L. acidophilus and L. bulgaricus had high flavour scores (≥45/50) and Str. thermophilus and Str. lactis 9_1 and HS1 scored 42-43. [See also FSTA (1971) **9P** 1475.] CDA

8 P 1203
[Method of obtaining a bacterial preparation.]
Belova, G. A.; Manenkova, A. I.; Klimovskii, I. I.; Krasheninin, P. F. (**Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 314 379 (1971) [Ru]

A starter for use in cheesemaking is produced by cultivating lactic acid bacteria (Streptococcus lactis 0.1%, Str. cremoris 0.6%, Str. diacetilactis 0.4% and Str. paracitrovorus 0.6%) on whey with an addition of hydrolysed milk and trace elements. After cultivation for 6 h, a sodium bicarbonate solution is added to bring the pH of the medium to 6.4-6.6 After 9-12 h, the culture is combined in 1:1 ratio with a protective solution containing 10% sucrose and 5% sodium citrate and freeze-dried. W&Co

8 P 1235
[Refrigerated storage of Mozzarella cheese made from buffaloes' milk.]
Rossi, J.
Scienza e Tecnica Lattiero-Casearia **23** (1) 24-38 (1972) [71 ref. It, en] [Istituto di Microbiol. Agraria e Tecnica, Univ., Perugia, Italy]

The author examines the effects of storage at -25°C for up to 90 days on the microbiological and chemical conditions of Mozzarella salted cheese, unsalted cheese and cheese curd. Total counts and counts of coliforms, streptococci, lactobacilli and yeasts fell in all cases; counts of psychrophiles rose. Moisture content fell by ~8-10%, pH by 0.1-0.2 units and the I value of the fat by 10-12. Soluble N content rose slightly as did also the peroxide value and TBA (thiobarbituric acid) index of the fat. Susceptibility of the fat to oxidation, as indicated by TBA values, developed earliest in the salted cheese and latest in the cheese curd. GTP

8 P 1244
Biosynthesis of α-acetolactate and its conversion to diacetyl and acetoin in cell-free extracts of Lactobacillus casei.
Branen, A. L.; Keenan, T. W.
Canadian Journal of Microbiology **18** (4) 479-485 (1972) [20 ref. En, fr] [Dept. of Animal Sci., Purdue Univ., Lafayette, Indiana, USA]

See also FSTA (1971) **3** 5P754.

9 P 1255
Abstracts of papers to be presented at the sixty-seventh annual meeting, Virginia Polytechnic Institute and State University, Blacksburg, July 26-29, 1972. Manufacturing section. [Bacteriology.]
United States of America, Dairy Science Association
Journal of Dairy Science **55** (5) 661, 666-667 & 669-671 (1972) [En]

Abstracts in this section concerning the bacteriology of milk and milk products include the following: Effect of H_2O_2 and chlorine dioxide on growth of selected organisms in milk, by T. E. Patrick & J. A. Collins (M12); Shelf-life of milk from retail outlets in northwest Arkansas, by J. A. Collins & T. E. Patrick (M35); Contamination of raw milk with psychrotrophic sporeformers, by R. Y. Cannon (M46); Effect of heating on activation of spores of Bacillus cereus, by T. E. Shehata & E. B. Collins (M47); Behaviour of Salmonella typhimurium and lactic acid bacteria during concurrent growth in skim-milk, by H. S. Park & E. H. Marth (M49); Behaviour of Staphylococcus aureus in cream and butter, by T. E. Minor & E. H. arth (M51); Low lactose milks from Lactobacillus helveticus derived lactose, by F. V. Kosikowski, L. E. Wierzbicki & T. Iwasaki (M54); and Effect of LFE Bioenhancer on acid production by lactic cultures, by S. M. Bhattad, T. Kristoffersen & K. R. Nath (M58). SAC

9 P 1356
[Application of the graphic differentiation method for measuring total and specific growth rates of lactic acid streptococci.]
Vasil'ev, N. F.; Novotel'nov, N. V.; Shmeleva, L. I.; Yakovlev, D. A.
Prikladnaya Biokhimiya i Mikrobiologiya **8** (2) 238-240 (1972) [6 ref. Ru, en] [Leningrad Tech. Inst. of Cold Storage Ind., USSR]

A graphical method for determination of the total and specific rates of multiplication of lactic acid streptococci from observations of their growth in milk is described. Data for the Streptococcus lactis, Str. cremoris and Str. diacetilactis mixture commonly used to ferment milk yielded results showing the specific growth rate to attain a max. after ~2 h incubation and to fall to zero in about 10 h. GTP

9 P 1371
[Fractionation of Mezenterin GR preparation by gel filtration.]
Zvyagintsev, V. I.; Sergeeva, E. G.; Tolkachev, A. N.; Gudkov, A. V.
Prikladnaya Biokhimiya i Mikrobiologiya **7** (5) 561-565 (1971) [12 ref. Ru, en] [Vses. Nauchno-issled. Inst., Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

A 20% filtered aqueous solution of Mezenterin GR preparation (obtained by spray-drying the culture filtrate of Bacillus mesentericus) was fractionated on Biogel R-30 (Bio-Rad-Laboratories, USA) with a 10 000-50 000 mol. wt. range. The fractions were tested for possible use as milk-clotting agents in cheesemaking. Of the 5 consecutive fractions, fractions 3 and 5 imparted a bitter, acid taste when incubated in sterilized milk. Only traces of bitterness appeared when Streptococcus cremoris E_8 was included in the incubation mixture. None of the fractions coagulated milk at pH 7.05 and only fractions 2 and 3 did so in the pH range 6.48-5.58, fraction 3 having ~2 × the activity of fraction 2. It is considered that fraction 3 could be used in cheese manufacture if inoculated simultaneously with a culture of lactic streptococci able to hydrolyse bitter peptides. SKK

9 P 1374
[Freeze-drying of starter cultures. I. Factors influencing the activity of freeze-dried cultures of Lactobacillus bulgaricus and Streptococcus thermophilus.]
Holzapfel, W. H.
South African Journal of Dairy Technology **3** (4) 183-192 (1971) [10 ref. Af, en] [Navorsingsinst. vir Vee- en Suiwelkunde, Irene, Transvaal, South Africa]

One pure commercial culture each of Str. thermophilus and L. bulgaricus was freeze-dried in each of the following substrates: arginine hydrochloride; asparagine; cystine hydrochloride; lactose; starch; sodium glutamate; and 10% skim-milk. Survival rate after freeze-drying was ~10% and varied little between substrates; survival was greater during subsequent storage for 15 wk at 5°C than at 25°C, sodium glutamate and skim-milk appearing to be the most efficient substrates for storage. Increasing the SNF from 10 to 20% or neutralizing substrates containing 10% SNF with NaOH resulted in higher survival rates after freeze-drying and during storage for up to 18 wk. Storage at -20°C instead of 5°C did not increase the survival rate. [From En summ.] CDP

9 P 1375
[Chemical composition and microbial flora of Vacherin cheese during ripening.]
Sozzi, T.; Shepherd, D.
Lait **52** (513/514) 203-219 (1972) [12 ref. Fr, en] [Soc. d'Assistance Technique pour Produits Nestle s.a., Lab. Ind. Orbe, Switzerland]

Samples were taken from the cheese milk, curd and ripening cheese at 3 factories in the Swiss Jura manufacturing Vacherin du Mont-d'Or cheeses (a quick-ripening, creamy-textured cheese). During the 1st 3 days, there was rise in total bacterial, streptococcal and micrococcal counts, after which numbers remained approx. stable; numbers of lactobacilli increased initially, dropped after salting, then rose to a max. at 8 days; results for coliforms were variable and only small numbers of yeasts, moulds and anaerobic bacteria were present. The crust was found to contain a higher proportion of casein breakdown products and ~4 × as many microorganisms as the centre. Cheese from La Sarraz and Agiez had a more typical flavour and was creamier than that from Arnex; the latter was the only cheese manufactured from milk which had been partially pasteurized and inoculated with a starter. La Sarraz and Agiez cheeses had the highest levels of casein breakdown products and bacteria, especially of anaerobic bacteria which were slow to develop and are believed to give the cheese its characteristic flavour. SAC

9 P 1377
[Experimental streptococcal starters for making Edam-type cheese.]
Scortescu, G.
Industria Alimentara **21** (2) 78-79 & 82 (1970) [2 ref. Ro, en, fr, de, ru] [Inst. de Cercetari Alimentare, Bucharest, Roumania]

Edam-type cheeses were made using 3 experimental mixed starters comprised of varying proportions of Streptococcus cremoris, Str. lactis, Str. diacetilactis and Leuconostoc. Chemical composition (DM, fat, NaCl and total and soluble N) and gradings of the cheeses are tabulated, with diagrams showing eye formation. Cheeses with the highest scores (96-98%) were obtained using the 2 starters containing high proportions of Str. diacetilactis and Leuconostoc (~45% of each in one and ~36% of each in the other); these organisms produced significant amounts of CO_2 and diacetyl. The 3rd starter, which contained only 5-10% Leuconostoc and 10-15% Str. diacetilactis, produced cheeses with scores of 94-95%. SAC

9 P 1390
[Thermoduric microflora of cows' milk.]
Tsonev, S.
Veterinarnomeditsinski Nauki **9** (2) 101-106 (1972) [12 ref. Bg, ru, en]

In a continuation of work described in the preceding abstr., counts of total bacteria, lactic acid bacteria, thermoduric bacteria, and aerobic and anaerobic sporeformers (after heating to 85°C for 10 min) were determined in 122 samples of milk. Lactic streptococci accounted for 42-93% of the total flora of the milk, and for 83-99% of the thermoduric flora, in which Streptococcus thermophilus predominated; micrococci and aerobic and anaerobic sporeformers were also present. Coliforms were not detected in pasteurized milk. SKK

9 P 1403
[Method of obtaining an acidified milk drink.]
Sukhotskene, I. I. (Litovskii Filial Vsesoyuznogo Nauchno-Issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 328 905 (1972) [Ru]

Buttermilk is pasteurized, pasteurized milk is added in 1:3 ratio, the mixture is cooled, inoculated with lactic acid streptococci, and incubated for 1-3 h, preferably at 23°C. W&Co

9 P 1409
[Yoghurt production through slow acidification at 30°C.] Joghurt-Herstellung durch Langzeitsäuerung bei 30°C.
Johannsen, G. B.
Deutsche Milchwirtschaft **23** (14) 488-490 (1972) [De]

The author describes the effects on the properties of yoghurt of using the specially developed "Yoghurt Type 30°, a slow-acting culture designed to facilitate over-night fermentation. This culture, operating at 30°C, produces in 10-12 h an excellent yoghurt typical in flavour and consistency. Used in combination with Streptococcus filant and the bio-activator Viskos D it furnishes a product of similar flavour but much higher viscosity, and in combination with Leuconostoc citrovorum, added to produce diacetyl, a yoghurt of superior flavour. GTP

9 P 1410
[Therapeutic or dietetic yoghurt, process for its manufacture, and powders containing milk obtained by these processes.]
Donikian, R. R. (Institut Merieux)
French Patent Application 2 073 279 (1971) [Fr]

A yoghurt contains at least 1 antibiotic-resistant strain of Lactobacillus bulgaricus, L. jugurti, L. helveticus, L. lactis, L. acidophilus, L. casei (particularly its variants alactosus and rhamnosus), L. plantarum, or L. leichmanii. It may also contain Streptococcus lactis or Str. thermophilus and various non-resistant strains. The starter is cultured in the liquid phase, freeze-dried and mixed with milk powder in the proportion of 1 to 10 (l.). This powder is marketed dry and the yoghurt is subsequently obtained by addition of water and incubation at 37-40°C. The product permits the survival of an intestinal microflora in persons having antibiotic treatment. W&Co

9 P 1411
[Bacteriological and biochemical properties of different types of starter.]
Lode, A.; Svensen, A.; Tufto, G. N.
Meieriposten **61** (13/14) 287-294; (15) 323-330; (16) 352-365; (17) 391-396; (18) 420-425; (19) 442-449 (1972) [21 ref. No, de] [Meierinst., Norges, Landbrukshogskole, Norway]

The bacteriological and biochemical characteristics of 4 strains of aroma-producing Leuconostoc isolated from butter starters are described in detail. A new starter, obtained by combination of 1 of these strains with selected strains of Streptococcus lactis and Str. cremoris showed, when compared with a commercial starter containing Str. diacetilactis and Leuc. citrovorum as aroma-producers, greater stability at 20°C, higher resistance to acidity, higher production of diacetyl and acetoin, and lower production of CO_2. Development of acidity was similar in both as was also formation of acetaldehyde and acetone in small amounts. Addition of Mn affected unfavourably the properties of the new starter, increasing the proportion of aroma-producing organisms present and accelerating the breakdown of diacetyl and acetoin. GTP

10 P 1433
[Inhibitory effect of pesticides on lactic acid bacteria.]
Yankov, Y.; Peeva, Yu.
Izvestiya na Nauchnoizsledovatelski Institut po Mlechna Promishlenost **4**: 181-188 (1970) [13 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

Test tubes containing solutions in sterilized skim-milk of DDT (0.1-10 000 ppm), γ-BHC (0.5-50 000 ppm), Dedelin (0.1-10 000 ppm) or 2-4-D (0.1-10 000 ppm) were inoculated with 1% of Streptococcus lactis, Str. thermophilus or Lactobacillus bulgaricus cultures in milk or of butter starter and incubated at temp. optimal for the organism. No significant effect was detected with pesticide concn. ≤100 ppm; concn. of 500-1000 ppm were bacteriostatic; and concn. of 10 000 ppm were bactericidal. SKK

10 P 1434
[Biological characteristics of some strains of lactic acid bacteria.] A book bekterii. [A book]
Erzinkyan, L. A.
234pp. (1971) [470 ref. Ru] Erevan, USSR: Izdatel'stvo Akademii Nauk Armyanskoi SSR. Price 1.64 rouble

The book deals with the following problems: fermented milk products and their use; composition and microorganisms of milk; microflora and chemical composition of matsun; methods of phenol determination in milk and dairy products; phenol resistance of lactic acid bacteria and yeasts; antimicrobial properties of lactic acid bacteria; interaction of lactic acid bacteria and azotobacteria; use of acidophilous milk and matsun; and manufacture of medicinal acidophilous milk. STI

10 P 1436
[Comparative study of the formation of free amino acids by local thermophilic lactic acid bacteria.]
Ogai, D. K.; Musaev, Sh. M.; Madrakhimov, Yu.
Prikladnaya Biokhimiya i Mikrobiologiya **6** (1) 103-106 (1970) [8 ref. Ru, en] [Otdel Mikrobiol. Akad. Nauk Uzbekskoi SSR, Tashkent, USSR]

2 strains of Streptococcus thermophilus and 1 strain each of Lactobacillus thermophilus and L. bulgaricus isolated from cultured milks were grown in a casein medium and caseinolytic activity and amounts of individual free amino acids liberated after 24-168 h were determined. Total amounts of free amino acids present after 168 h were 48 mg/100 ml for 1 strain of Str. thermophilus and 54 mg for the other, 78 mg for L. thermophilus and 115 mg for L. bulgaricus. The relative amounts of individual amino acids varied with time of cultivation and strain of microorganism. SKK

10 P 1448
[Effect of cooling milk immediately after milking on its microbiological quality.]
Kielsznia, R.
Medycyna Weterynaryjna **26** (6) 331-333 (1970) [32 ref. Pl] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

During June and July 1966, the microbiological quality of milk cooled to 2-4°C in collective cooling units (see Roczn. Inst. Prezm. mlecz. **12** (2) 55-73) was compared with that of control milk held at ambient temp. (14-20°C, mean 18°C). In comparison with controls, cooled milk from the noon milking showed, after overnight storage, a 3-fold longer methylene blue reduction time (5 h 15 min vs. 1 h 42 min), a 5-fold lower total bacterial count (8.24 million vs. 41.7 million/ml), a 6-fold lower count of lactic acid bacteria (3.4 million vs. 21.5 million/ml), and a 2.5-fold higher psychrophilic count (0.24 million vs. 0.09 million/ml). For evening milk, the corresponding differences were: 7-fold longer, 20-fold and 40-fold lower and 2-fold higher. It is concluded that, because of the potential technological risks involved in the multiplication of psychrophilic bacteria, prolongation of the cooling period of heavily contaminated milk without simultaneous improvement of hygienic quality can only be harmful. SKK

10 P 1476
[Properties of Lactobacillus lactis strains as starter component for large cheeses.]
Dilanyan, Z. Kh.; Ter-Kazar'yan, S. Sh.; Vegapetyan, K. V.
Prikladnaya Biokhimiya i Mikrobiologiya **5** (5) 635-636 (1969) [6 ref. Ru, en] [Zootekh.-Vet. Inst., Erevan, USSR]

Formation of acidity (in the presence and absence of phenol), diacetyl, acetoin and volatile acids, proteolytic properties, and milk coagulation time were determined of 84 strains of Lactobacillus lactis which had been isolated from mature Swiss and Sovetskii cheeses and characterized as described by Ter-Kazar'yan & Ter-Simonyan [Biol. Zh. Arm. (1968) **21** (1) 41-46]. Density, viscosity and organoleptic properties of the coagulum were also studied. It is concluded from tabulated results that all characteristics studied varied markedly (from 2-3-fold to 20-30-fold) between strains. ~25% of the strains exhibited properties considered suitable for starter use (acidity after 24 h, >170°T; max. acidity, >200°T; acidity in presence of 0.5% phenol, >75°T; coagulum density, >1.2 g/cm^2; coagulum viscosity, <200 cP). [See also FSTA (1971) **3** 7P1119 & 4P672.] SKK

10 P 1495
Studies on the use of preservatives in the dairy industry. I. A preliminary report on the effect of formaldehyde on certain factors of importance in the manufacture of Domiati cheese.
Rakshy, S. E. S. E.; Hassan, N.
Indian Journal of Dairy Science **24** (4) 172-175 (1971) [8 ref. En] [Dept. of Agric. Ind., Univ. of Alexandria, United Arab Republic]

Addition of formaldehyde to give a final concn. of 0.8 or 3.2 µg/ml completely inhibited acid production and multiplication of total and coliform bacteria in raw milk, and acid production by Streptococcus lactis (a strain used in experimental Domiati cheesemaking) in fresh skim-milk; it also increased the rennet coagulation time from 15 to 25 min in unsalted raw milk but had no effect on coagulation time in salted milk. The method of Romani [Boll. Lab. Chim. Prov. (1965) **16**: 148], but using a 1:5 dilution of H_2SO_4 was found to be suitable for detecting formaldehyde in milk, whev and cheese. CDP

10 P 1499
[Effect of high moisture content and L. plantarum on the ripening of Dutch-type brick cheese.]
Ramanauskas, R. I.; Sukhotskene, I. I.; Kairyukshtene, I. P.; Norkute, A. A.
Prikladnaya Biokhimiya i Mikrobiologiya **5** (4) 445-450 (1969) [10 ref. Ru, en] [Vses. Nauchno-izsled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Litovskii Filial, Kaunas, USSR]

(i) Dutch type brick cheese of increased moisture content (~45% after pressing) were made commercially by lowering scalding temp. to 39°C and adding 0.2-0.3 kg salt/100 l. milk at the vat treatment stage. The factory starters was composed of Streptococcus lactis, Str. cremoris, Str. paracitrovorus and Str. diacetilactis (strain that did not produce diacetyl). (ii) A further batch of increased-moisture cheese was made using the factory starter + 0.05% of a Lactobacillus plantarum culture, and (iii) cheeses of customary moisture content (~43% after pressing) served as control. (i)-(iii) were examined 10, 30 and 75 days after manufacture. (ii) and (iii) ripened more rapidly than (i). Numbers of lactic streptococci were reduced and those of lactobacilli markedly increased in (iii) in comparison with (ii); as a result, proteolysis and lactic acid accumulation were intensified in (iii), which showed slightly less satisfactory eye formation and an indication of spicy taste. Consistency of (ii) and (iii) was definitely better than that of (i) and taste and aroma were slightly less pronounced. [See Ramanauskas, R. et. al. Trudy lit. Filial. vses. nachno-issled. Inst. maslodel'n. syrodel'n. Prom. (1968) (3) 63-69.] SKK

10 P 1500
[Chemical and microbiological study of ripening of Gorgonzola cheese.]
Ottogalli, G.; Resmini, P.; Bianchi, B.; Galli, A.; Rondinini, G.; Salvadori, P.; Saracchi, S.; Volonterio, G.
Latte **45** (11) 776-789 (1971) [36 ref. It, en] [Istituto di Microbiologia Agraria, Univ., Milan, Italy]

Gorgonzola cheese was made by the normal method from milk pasteurized at 72°C for 15-20 sec, using Streptococcus thermophilus + Lactobacillus bulgaricus starter and inoculation with Penicillium roqueforti var. weidemannii. The cheese was examined before and after the salting at 20-25°C, and at various times during ripening at 5°C. The chemical results demonstrate a marked increase in free amino acids, NH_3 and methyl ketones after the 45th day of the 2 months ripening. The bacteriological results demonstrate the development of lactic acid bacteria in the milk, thermophilic bacteria in the curd during draining and salting in the warm room, and mesophilic lactic acid bacteria during ripening, following by the development of the Penicillium following inoculation. The rind contains Candida and Torula yeasts as well as yellowish micrococci and reddish Arthrobacter. JMD

10 P 1505
[Effect of antibiotics in White pickled cheese manufacture.]
Yankov, Ya.
Izvestiya na Nauchnoizsledovatelski Institut po Mlechna Promishlenost **4**: 209-216 (1970) [10 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

Effects were studied of antibiotics commonly used in treatment of dairy cows on cultures in sterilized skim-milk of 28 strains of Streptococcus lactis from the collection of the Dairy Industry Research Institute in Vidin. Bacteriostatic concn. were: benzylpenicillin, 0.3-0.1 IU/ml, streptomycin sulphate, 0.0002 mg/ml, tetracycline hydrochloride, 0.0003 mg/ml and chlortetracycline hydrochloride, 0.0002 mg/ml. Corresponding bactericidal concn. were >1 IU/ml, 0.0002-0.003 mg/ml, 0.0004-0.000 mg/ml, and 0.0002-0.0003 mg/ml. White pickled cheeses were made from pasteurized milk to which 0.05, 0.1, 1 or 2 IU benzylpenicillin/ml were added. Lactic acid fermentation was inhibited by concn. of ≥0.1/IU/ml and prevented by concn. of ≥1 IU/ml. When coliforms were present, even in small quantities, a penicillin concn. of 0.1 IU/ml sufficed to cause early and late blowing of White pickled cheese. SKK

10 P 1511
[Butter production using starters composed of aroma-producing streptococci of local origin.]
Yankov, Ya.
Izvestiya na Nauchnoizsledovatelski Institut po Mlechna Promishlenost **4**: 201-208 (1970) [12 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

A series of butter starters was prepared using local strains of lactic streptococci (Streptococcus lactis and Str. cremoris) and aroma-forming streptococci (Str. diacetilactis and Str. paracitrovorus) in proportions varying from 1:1 to 1:3. The starters were cultured in pasteurized cows' milk at 23&C for 12-15 h, stored at 4-6°C, and aroma formation was assessed 18-24 h after preparation and also after repeated subculturing for ≤16 months. Data on pH, and contents of acetoin, volatile acid and diacetyl (the last determined at 2, 4, 8, 11 and 16 months) are tabulated for 38 starters. In the majority of starters, diacetyl formation was less intense after subculturing, and in 10 it became stronger. Best starters produced 4-12 mg diacetyl/l. 5 of them were compared in commercial buttermaking with a Danish starter and produced butters containing more diacethyl and awarded a higher organoleptic score. SKK

10 P 1536
[Streptococcus lactis strain 1605.]
Pyanitsyna, I. N. (**Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 326 218 (1972) [Ru]

Morphological and biochemical characteristics are described of Streptococcus lactis 1605, which is used in the production of acidified milk products. W&Co

10 P 1569
[Lactic acid milk beverage.]
Kugita, M.
Japanese Patent 15 730/72 (1972) [Ja]

A defatted milk composition previously cultured with Lactobacillus acidophilus is inoculated with L. casei and, after additional cultivation, is combined with a sweetening agent. IFT

10 P 1589
The determination of the configuration of lactic acid produced in milk.
Lunder, T. L.
Milchwissenschaft **27** (4) 227-230 (1972) [4 ref. En, de, fr] [Res. Lab., Nestle Products, Vevey, Switzerland]

Configuration of lactic acid produced by various strains of lactic acid bacteria in milk media was determined by measuring total and L-(+)-lactic acid. The Ling method as modified by Mattsson [Rep. Milk Dairy Res. Alnarp (1965) No. **71**] for determination of total lactic acid was further modified during the deproteinization stage by using centrifugation instead of filtration and by using N HCl to solubilize $FeCl_3$ when making up the colorimetric reagent. L-(+)-lactic acid was determined by the method of Sigma Chem. Co. in which lactic dehydrogenase from rabbit muscle catalyses the reduction of L-(+)-lactic acid to pyruvic acid in the presence of NAD; careful control of the moisture content of the NAD to 9.3-9.9% is essential. These methods were used to determine the configuration of lactic acid produced by 18 strains of lactic acid bacteria including 4 ATCC strains. CDP

10 P 1603
[Effect of bacterial cultures on continuous fermentation of milk in tvorog manufacture.]
Kudryavtseva, T. A.; Patkul', G. M.
Molochnaya Promyshlennost' **33** (6) 21-24 (1972) [8 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

163 strains of lactic streptococci isolated from dried and fresh fruit, berries, flowers, nuts and vegetables were screened for acid and coagulum production in milk pasteurized at 76-80°C for 15 sec and containing residual bacterial flora. 40 strains, all capable of bringing acidity to 60-70°T in 6 h at 30°C when added at 2%, were further tested for resistance to phenol and penicillin [see Patkul', Moloch. Prom. (1968) **29** (1) 6-9] and those of them resistant to either or both and showing no antagonism in joint cultures of 3-4 strains were used to compound 16 mixed starters. These starters were all found suitable for continuous fermentation of pasteurized milk by the cyclic and straight-flow procedures using laboratory installations. Streptococcus acetoinicus strains from lemons, red cabbage, sorrel and dill, Str. lactis strains from walnut, apple, dried pear, chestnut, cucumber and sorrel and a Str. cremoris strain from orange were represented in the selected starters. The best of these starters were tested in continuous commercial production of tvorog from 2450 metric tons of milk with satisfactory results. SKK

10 P 1623
[Use of freeze-dried starter cultures in the manufacture of White pickled cheese.]
Stefanova-Kondratenko, M.; Nikolova-Toteva, N.
Molochnaya Promyshlennost' **33** (6) 41-44 (1972) [2 ref. Ru] [Tsentralna Lab. po Mlechna Promishlenost, Sofia, Bulgaria]

Whole milk was incubated for 8-12 h at 32°C with 1% cheese starter culture consisting of Streptococcus lactis strain 15 and Lactobacillus casei strain 40 and the resultant starter was freeze-dried and packaged in 40-g portions in polyethylene bags. White pickled cheeses were made industrially by customary procedure from 400-800 l. batches of cows' or ewes' milk pasteurized at 68-70°C using 20, 40, 50 or 150 g starter/400 l. milk added directly to the vat. Control cheeses were made using 200g liquid starter/100 l. milk. Cheeses were sampled 24 h, 45 days and 6 months after manufacture and examined microbiologically and for usual chemical and physical characteristics. The results are tabulated or graphically presented. It was found that lactic acid bacteria developed equally in experimental and control cheeses, and that there was no substantial difference in contents of casein breakdown compounds; control cheeses had a harder consistency and contained less moisture. Experimental cheeses, particularly those made using 40 g starter/400 l. milk, were awarded higher scores on organoleptic assessment than the control cheeses. Freeze-dried starters are recommended for industrial production of White pickled cheese. SKK

10 P 1625
[Microbiology of Grana cheese. VIII. Citrate-fermenting lactobacilli in Grana cheese.]
Battistotti, B.; Bottazzi, V.
Scienza e Tecnica Lattiero-Casearia **23** (2) 59-70 (1972) [14 ref. It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

Citrate-fermenting lactobacilli isolated from 4 samples each of cheese vat milk, fresh whey and fermented whey and from 6 samples of Grana cheese of up to 7 days old were identified. Of 74 organisms isolated, 19 were assignable to Lactobacillus casei, 23 to L. jugurti, 9 to L. helveticus, 6 to L. lactis, 8 to L. brevis/L. fermenti, and 8 were unclassifiable. Counts varied greatly from sample to sample but were usually low (<2500/ml) in vat milk and fresh whey, much higher (1.3×10^5 to 7×10^7/ml) in fermented whey, and lower ($\leq 2.2 \times 10^6$/ml) in the cheese. Some influence on the organoleptic properties of cheese cannot be excluded in cases where fermented milk counts are high. GTP

10 P 1626
[Proteolytic activity of lactobacilli present in cheeses and whey from a cheese factory.]
Tourneur, C.
Lait **52** (513/514) 149-174 (1972) [39 ref. Fr, en] [Ecole Nat. Superieure Agronomique, Grignon (78), France]

Proteolytic activities were determined of a total of 103 strains of 10 spp. of Lactobacillus isolated from cheeses, whey and yoghurt in which they were the predominant bacteria. Species were grouped into (i) streptobacteria, (ii) betabacteria and (iii) thermobacteria; the groups were very heterogeneous with respect to proteolytic activity, relative activities of cytoplasmic and surface-bound enzymes, and the products of enzyme activity. ~90% of strains in group (i) had proteolytic activity (as μg tyrosine liberated/ml/h) of ≤5; in group (ii) activities of up to 7.5 were found except in the case of L. fermenti which had very weak proteolytic activity; and individual strains of the 6 spp. in group (iii) varied markedly in proteolytic activity (0-25 μg), except for the 9 strains of L. jugurti, 60% of which had a proteolytic activity of ≤2.6 μg. CDP

11 P 1651
Effect of incubation temperature on acid and flavour production in milk by lactic acid bacteria.
Dutta, S. M.; Kuila, R. K.; Arora, B. C.; Ranganathan, B.
Journal of Milk and Food Technology **35** (4) 242-244 (1972) [16 ref. En] [Nat. Dairy Res. Inst., Karnal (Haryana), India]

8 lactic starter cultures were grown in sterile reconstituted dried skim-milk at 22 and 30°C or at 37 and 42°C, and examined after 18 h. Titratable acidity at 22 and 30°C (% lactic acid) and volatile acidity (ml 0.01N NaOH/50 g curd) at 22 and 30°C respectively were as follows: Streptococcus cremoris C1, 1.0, 0.92, 6.0 and 8.4; Str. diacetilactis DRC1, 0.8, 0.9, 22.5 and 22.7; and Str. lactis C10, 0.85, 0.86, 6.4 and 8.2. Corresponding values for cultures incubated at 37 and 42°C respectively were: Str. thermophilus HST, 0.82, 0.75, 5.0 and 7.3; Lactobacillus casei L8, 0.22, 0.15, 6.5 and 4.5; L. helveticus L23, 0.24, 0.15, 4.8 and 2.5; L. bulgaricus LBW, 1.4, 1.85, 23.0 and 26.0; and L. plantarum L24, 0.25, 0.23, 6.8 and 7.4. Str. diacetilactis produced more diacetyl at 22 than at 30°C (25 vs. 14 ppm) but less acetoin (13 vs. 87 ppm); Str. thermophilus produced less diacetyl at 37 than at 42°C (6 vs. 12 ppm). Incubation temp. had no significant effect on proteolytic activity. CDP

11 P 1652
[Method for utilization of Penicillium chrysogenum extract in the nutrient media for control in the manufacture of cultured milks.]
Kirsanov, G. P.
Prikladnaya Biokhimiya i Mikrobiologiya **7** (1) 95-98 (1971) [2 ref. Ru, en] [The Mordovian St. Univ., Saransk, USSR]

See FSTA (1971) **3** 12P2031.

11 P 1672
[Imparting aroma to sweet-cream butter.]
Chuzhova, Z. P.; Sidorova, E. A.; Kuleshova, G. A
Molochnaya Promyshlennost' **33** (6) 15-16 (1972) [Ru] [Vses. Nauchno-issled. Inst. Maslode'noi i Syrodel'noi Promyshlennosti, USSR]

The possibility of imparting flavour to sweet-cream butter was studied using an aroma-producing Streptococcus diacetilactis culture, which was added at a rate of 2-3% to high-fat cream in continuous buttermaking lines. The results, given for 2 butter factories show that the butter had better flavour than control butter (42-43 vs. 39-41 points). FL

11 P 1689
[Changes in physico-chemical properties of milk during its ripening.]
Ozola, L. Yu.
***Molochnaya Promyshlennost'* 33** (6) 38-40 (1972) [Ru] [Latviiskaya Selskokhozyaistvennaya Akad., USSR]

The effects on titratable acidity, pH, buffer capacity, renneting time and rate of curd syneresis of holding raw and pasteurized milks at fairly low temp. for 24 h were studied. At 2 and 6°C, acidity and pH hardly changed, but renneting time increased by 23-60% and rate of syneresis decreased by 13.9-21.3%. At 10°C, acidity increased by 1.1-1.6°SH, pH fell by 0.03-0.14, renneting time decreased by 33-78% and rate of syneresis increased by 9.7-16.5%. The changes at 10°C were accompanied by a 3 to 3.6-fold increase in bacterial count, mainly lactic streptococci, and an increase in the number of proteolytic organisms of from 4.7 to 7.2% of the total. At 14°C, acidity increased by 26°SH. GTP

11 P 1691
[Synthesis of free amino acids by 'bitter' and 'non-bitter' strains of lactic acid streptococci.]
Zvyagintsev, V. I.; Gudkov, A. V.; Buzov, I. P.; Medvedeva, Z. P.
***Prikladnaya Biokhimiya i Mikrobiologiya* 7** (1) 51-54 (1971) [13 ref. Ru, en] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Moscow, USSR]

"Bitter"-producing strains of Streptococcus lactis 976_{24}, 79_6 and 406_3 were each cultured in sterilized milk with added chalk for 7 days at 26°C with and without rennet. Peptides and free amino acids were then extracted and compared with those obtained from "non-bitter"Str. cremoris E-8. The proportion of glutamic acid produced in the culture fluid by strain E-8 was higher than that produced by the other strains. A cell concentrate of strain E-8 was also added to a 4-day-old culture of Str. liquefaciens: the original strong bitter taste was considerably reduced after a further 4 days incubation, contents of bitter peptides (as mg% alalnine) having decreased from 4.67 to 1.12. It was considered that free glutamic acid content of culture fluids may be used to select 'non-bitter' strains of lactic streptococci for cheesemaking. (See FSTA (1969) **1** 12B342.) BEPC

11 P 1699
[Observations on the variation of the microflora during production and ripening of Teleme cheese.]
Manolkidis, K. S.; Tzanetakis, N. M.
***Hemika Hronika* 37** (4) 87-89 (1972) [16 ref. Gr, fr]

Variations in total microflora, lactic acid bacteria, coliform bacteria and E. coli I during production and ripening of Teleme cheese were studied. Counts of total bacteria and coliforms increased slightly towards the end of salting of the coagulum, while lactic acid bacteria were reduced. E. Coli I increased in 1 case studied. During ripening the total microbial and lactic acid bacteria counts decreased, but remained at an elevated level. 90 days after closing the containers, average count/g of cheese was 60 for coliforms and 6 for E. coli I. [From Fr summ.] RM

11 P 1717
[Hydrolysis of whey proteins by lactic acid bacteria during yoghurt manufacture.]
Luca, C.
***Industria Alimentara* 23** (4) 180-183 (1972) [11 ref. Ro, en, fr, de, ru] [Inst. Politehnic, Galati, Roumania]

Hydrolysis of whey proteins in milk at 39-40°C for up to 6-8 days was investigated using Lactobacillus bulgaricus and Streptococcus thermophilus either singly or in the ratio 1:1, 1:2 and 2:1; graphs are presented of changes in mg% N of the various N fractions. L. bulgaricus was found to possess greater proteolytic activity than Str. thermophilus; the increases in non-protein N were 77 mg% for L. bulgaricus in 6 days, 52 mg% for the 2:1 mixed culture in 6 days, 43 mg% for the 1:1 mixed culture in 7 days and for the 1:2 in 8 days, and 10 mg% for Str. thermophilus in 6.5 days. SAC

11 P 1752
Stimulation of lactic streptococci in milk by β-galactosidase.
Gilliland, S. E.; Speck, M. L.; Woodward, J. R., Jr.
Applied Microbiology **23** (1) 21-25 (1972) [11 ref. En] [Dept. of Food Sci., North Carolina St. Univ., Raleigh, 27607, USA]

Acid production in milk culture of several strains of Streptococcus cremoris and Str. lactis was stimulated by the addition of β-galactosidase, although the growth rate was unaffected in all but one strain. In control cultures with no added β-galactosidase, glucose was not detected but galactose tended to accumulate, especially during the phase of rapid acid production, indicating that not all the galactose from lactose catabolism was utilized. In the presence of β-galactosidase there was an accumulation of glucose during the 1st 3 h of incubation, but this ceased during rapid acid production; galactose accumulated throughout the incubation period. Growth of all the strains tested in broth was most rapid with glucose added and slowest with galactose added. The authors conclude that lactose catabolism is rate limiting for lactic acid production by lactic streptococci growing in milk, and that glucose is utilized preferentially over either galactose or lactose. BAL

12 G 566
[Cheese-like soybean food.]
Asahi Electro-Chemical Co. Ltd.
Japanese Patent 20 381/72 (1972) [Ja]

Dehydrated soybean curd is combined with a fungus having strong proteolytic activity, a lactic acid starter and NaCl and held at controlled conditions of temp. and humidity to yield a "soybean cheese" which is then mixed with sake cake. IFT

12 P 1774
[Improved nitrate reduction test.] Eine verbesserte Nitratreduktionsprobe.
Rapp, M.; Münch, S.; Prinz, I.; Enkelmann, D.
Milchwissenschaft **27** (6) 355-360 (1972) [15 ref. De, en] [St. Milchwirtschaftliche Lehr- und Forschungsanstalt, Dr. Oskar Farny-Inst., Wangen im Allgäu, German Federal Republic]

A modified nitrate reduction test is described in which increased sensitivity and rapidity (2 h incubation at 37°C suffices) were achieved by addition of aqueous yeast extract to the reagent. A comparison with methylene blue and resazurin tests made on 323 raw milks showed the nitrate reduction test to be superior to both for quality control, placing only 59.5% of the milks (average bacterial count of 680 000/ml) in class I as against 71% (average count 840 000/ml) with the methylene blue and 84% (average count 991 000/ml) with the resazurin test. Milks with high numbers of coliforms and non-acidformers, the organisms which characterize the modern machine-milked and refrigerated product were more readily detected by the nitrate reduction test. Of 18 strains of bacteria commonly found in raw milk 6 (all coli-aerogenes group) reduced nitrate strongly, 5 (Staphylococcus, Aermomonas, Proteus and Serratia spp.) moderately and 7 (Salmonella, Staphylococcus, Streptococcus and Pseudomonas spp.) weakly. GTP

12 P 1776
[Variations in the reducing activity of lactic acid streptococci during their development in milk.]
Belova, G. A.
Prikladnaya Biokhimiya i Mikrobiologiya **8** (3) 327-331 (1972) [Ru, en] [All-Union Res. Inst. Butter & Cheese Ind., Uglich, USSR]

1-l. quantities of sterile milk at 30°C were inoculated with 5% of 16-18-h cultures of Streptococcus lactis 522_9, Str. cremoris $T18_{15}$, Str. cremoris 625_4 or Str. acetoinicus 364_1 (strong acid producers) or 24-48-h cultures of Str. acetoinicus 161_3 (weak acid producer) or Leuconostoc citrovorum 641_{22}. Samples were taken at intervals during incubation for 72 h at 30°C, and pH, acidity and resazurin reduction time were determined and related to total bacterial count on hydrolysed milk agar. Max. reducing activities occurred before curd formation and did not coincide with max. total count. When centrifuged 9- or 12-h cultures of St. lactis, Str. cremoris, Str. acetoinicus and Leuc. citrovorum were mixed and resuspended in 10% sucrose/5% sodium citrate, reducing activity of mixed 9-h cultures developed more rapidly than that of mixed 12-h cultures. Other characteristics of 9-h cultures were similar to those of the individual organisms grown separately. Reducing activities were in the descending order Str. cremoris 625_4 > Str. lactis>Str. acetoinicus 364_1>Str. acetoinicus 161_3> mixed suspensions>Str. cremoris $T18_{15}$>Leuc. citrovorum. BEPC

12 P 1777
[Assessment of antibodies neutralizing Streptococcus lactis bacteriophages in milk.]
Strzalkowska-Domanska, M.
Roczniki Instytutu Przemyslu Mleczarskiego **14** (1) 13-24 (1972) [6 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

Raw milk containing antibodies to Str. lactis R4 bacteriophages at a titre of 300 [see Roczn. Inst. Przem. miecz. (1971) **13** (2) 63-70] was added 1-10% to sterilized skim-milk containing 0.6% of a 20-24 h culture of Str. lactis R4 and 2×10^4-3.5×10^8 of homologous bacteriophage in sterile whey. Similar experiments were also carried out using pasteurized immune milk. The mixtures were examined after incubation at 30°C for 24 h for coagulum consistency, titratable acidity, phage titre, phage neutralization (methylene blue) and total bacterial count. It is concluded from tabulated results that specific antibodies completely neutralize Str. lactis phages in milk; that addition of 7-10% immune milk (300 titre) to phage-contaminated milk ensures phage neutralization within 24 h and normality of the fermentation process; that examination of coagulum is not a satisfactory guide to phage inhibition, since highly contaminated milk coagulated in 24 h in the absence of antibodies; and that phage neutralization by antibodies may be monitored by methylene blue reduction, identification of phages, difference in acid production and determination of phage titre or total bacterial count. SKK

12 P 1798
Making yoghurt via vat method.
Angevine, N. C.
Dairy and Ice Cream Field **155** (7) 52-53 & 86 (1972) [En] [American Cultured Dairy Products Inst., St. Petersburg, Florida, USA]

After outlining his research on the manufacture of ordinary yoghurt and procedures used by manufacturers, the author described briefly the production of acidophilus yoghurt, plain and flavoured with fruit (orange, strawberry and raspberry). The inoculation was done with a new Lactobacillus acidophilus yoghurt culture, replacing L. bulgaricus. A testing panel noted little difference in flavour compared with a plain normal yoghurt, and generally approved its pleasant, clean and rather mild flavour. Flavoured variants would be about the same as normal flavoured yoghurt because of the effect of the fruit. FL

12 P 1811
Cheese flavour development using direct acidified curd.
Singh, S.; Kristoffersen, T.
Journal of Dairy Science **55** (6) 744-749 (1972) [15 ref. En] [Dept. of Food Sci. & Nutr., Ohio St. Univ., Columbus, 43210, USA]

Highly acceptable cheese flavour developed in slurry prepared from direct acidified curd inoculated with 5% lactic culture and supplemented with 100 mg reduced glutathione, 10 mg Co, 2 mg riboflavin and 20 mg diacetyl/kg. Lactic culture, glutathione and initial and daily pH adjustment to 5.3 of the slurry were essential to cheese flavour development. The other additives accentuated the flavour and chemical changes. Desirable flavour development was associated with relatively rapid acid formation and active SH groups. Total number of bacteria and the number of yeasts were similar for slurries with and without lactic culture and additives. However, lactic culture addition decreased coliforms approximately 100-fold. Heating slurries to 62° and 77°C for 30 min adversely affected flavour development, but the capacity of heated slurries to develop desirable flavour was restored in part by the addition of rennet. The latter effect was related to the degradation of α_s-casein. JMD

12 P 1840
[Effect of lactic acid bacteria on the development of coagulase-positive staphylococci in milk.]
Trin'ko, S. E.
Molochnaya Promyshlennost' **33** (5) 9-11 (1972) [10 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Sterilized skim-milk was inoculated at various levels with broth suspensions of 1 of 2 strains of coagulase-positive staphylococci isolated from tvorog or 1 of 2 collection strains of Staph. aureus; 3% of 24-h culture of 1 of 3 strains of Streptococcus lactis or of 1 of 2 strains of Str. cremoris, or of 1 of 3 mixed tvorog starters was added, the mixture was incubated at 26°C and growth of staphylococci was determined at 6, 8 and 24 h. A marked bacteriostatic effect of streptococci on staphylococci was observed irrespective of species or strain. White, pathogenic colonies of Staph. aureus appeared among the coloured ones in the presence of streptococci. SKK

12 P 1841
[Bacillus species in South African raw and pasteurized milk.]
Fourie, K. H.; Hermann, M. N.; Bester, B. H.
South African Journal of Dairy Technology **4** (2) 127-133 (1972) [26 ref. Af, en] [Animal and Dairy Sci. Res. Inst., Irene, Transvaal, South Africa]

The spore count and Bacillus species present in raw and pasteurized milk from 4 factories were determined. It was found that a heat treatment of 80°C for 10 min was not sufficient to kill all vegetative cells in the milk, consequently rendering the 'spore' counts inaccurate. From 1187 isolates, 71% were Bacillus spp. and 29% were non-sporeforming bacteria [mainly Micrococcus and Flavobacterium spp.]. Of 787 isolates, 21.4% were B. licheniformis, 23.7% B. pumilus, 20.0% B. subtilis and 12.2% B. cereus. Other Bacillus spp. [13] each constituted <4% of the total number of isolates. No B. stearothermophilus isolates were found in the samples examined. AS

12 P 1848
[Effect of pure dairy cultures on quality and rheological properties of cultured milk products.]
Hylmar, B.; Teply, M.; Cepickova, V.; Dolezalek, J.
Prumysl Potravin **23** (8) 253-256 & inside back cover (1972) [5 ref. Cs, ru, en] [Vyzkummy Ustav Mlekarensky, Prague, Czechoslovakia]

Skim-milk heated at 85°C for 1 min was inoculated with various starters including pure cultures of strains of Streptococcus thermophilus, Str. lactis, Lactobacillus acidophilus, L. bulgaricus, yoghurt starters and 5 cream starters (Czechoslovakian, Soviet, Danish (2), and German Federal Republic) and firmness and viscosity (flow and dynamic) of coagulum as well as titratable acidity, contents of volatile fatty acids, diacetyl and acetoin, and extent of whey separation were determined. The results are tabulated and relationship between culture type and coagulum properties are discussed. SKK

12 P 1849
[Effect of culture conditions on the development of kefir starter microflora.]
Krasnikova, L. V.; Novotel'nov, N. V.; Shmeleva, L. I.
Prikladnaya Biokhimiya i Mikrobiologiya **6** (5) 551-556 (1970) [19 ref. Ru, en] [Leningrad Tech. Inst. of Cold Storage Ind., USSR]

For continuous production of kefir starter, kefir grains were added to sterile whole or skim-milk in a 6 l. 3-chamber reactor vessel. After fermentation with stirring for 18 h at 22-24°C (milk acidity, 85°), kefir starter was produced by continuous addition of further milk to give a final acidity of 50-55°. Samples were taken at intervals and bacterial and yeast spp. enumerated on Rogosa acetate, Davis tomato juice and Galesloot citrate media; lactic acid bacteria required addition of yeast extract for growth on solid media. Results were compared with those obtained in samples taken every 3 h for 24 h from batch cultures having the same initial (1:20) kefir grain:milk ratio. In batch culture, lactic streptococci developed more rapidly than Lactobacillus caucasicus or yeasts. In continuous culture, the growth rate of yeasts was higher whereas that of Streptococcus lactis and L. caucasicus remained unchanged. Clear areas, indicative of aroma-producing bacteria, were obtained when Lactobacillus caucasicus was cultured on citrate medium. BEPC

12 P 1852
Studies on the proteolytic action of dairy lactic acid bacteria. XII. Significant contribution of intracellular protease of lactic acid bacteria to the casein hydrolysis in cheese ripening.
Ohmiya, K.; Sato, Y.
Milchwissenschaft **27** (7) 417-422 (1972) [13 ref. En, de] [Dept. of Agric. Chem., Nagoya Univ., Japan]

Apparent proteolytic activity of intracellular proteases of lactic acid bacteria (IPLB's) was 0.01-0.24 (as OD at 280 nm) for 10^9 Streptococcus cremoris and 0.011-0.052 for 10^9 Lactobacillus helveticus. Approx. 15% of rennin activity was retained in the curd after removal of the whey and proteolytic activity of rennin in 1 g cheese curd was calculated to be 0.018. Extent of hydrolysis of casein by rennin + IPLB was greater than the sum of hydrolysis by the 2 enzymes alone; this seemed to be due to differences in the specificities of IPLB's and rennin. Casein which had already been hydrolysed by IPLB's could be further hydrolysed by rennin, which suggests that rennin could progressively hydrolyse cheese curd even at the late stages of ripening. Since IPLB's are released from autolysing bacteria and increase in the cheese curd during ripening, it is thought that they contribute to the hydrolysis of casein to a greater extent than does rennin. [See FSTA (1971) **3** 6P925 for part XI.] CDP

12 P 1853
[Studies on the microorganisms of Camembert cheese. V. The roles of mould and lactic starter on the ripening of Camembert cheese.]
Kikuchi, T.; Takafuji, S.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] **43** (3) 155-160 (1972) [14 ref. Ja, en] [Tech. Res. Inst., Snow Brand Milk Products Co. Ltd., Tokyo, Japan]

Distribution of N compounds was determined in (i) control cheese, (ii) cheeses prepared without mould inoculation and (iii) cheeses prepared without lactic starter inoculation. Each N compound was found at higher levels in (i) than in (ii) or (iii). Tyrosine and 12% trichloroacetic acid-soluble N were found at higher levels in (ii) than (iii), but (iii) contained more acid (pH4)-soluble N. Casein was only slightly decomposed by lactic starter and rennin, but in the presence of moulds the process was accelerated and the amount of low molecular N compounds increased. [From En summ.] [See FSTA (1972) **4** 4P468 for part IV.] CDP

12 P 1854
[Studies on the microorganisms of Camembert cheese. VI. The relationship between microflora and proteolytic activity in Camembert cheese.]
Takafuji, S.; Kikuchi, T.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] **43** (4) 181-186 (1972) [9 ref. Ja, en]

Microflora and proteolytic activity were determined in (i) control, (ii) "no mould" and (iii) "no lactic starter" cheeses (see preceding abstr.). Streptococcus lactis and Str. cremoris predominated in (i) and (ii) throughout ripening, but wild strains of Str. lactis, Str. thermophilus and Str. bovis, thought to originate in the raw milk, predominated in (iii). Proteolytic activity in the cheese was in the order (i) > (ii) > (iii), a marked increase occurring in proteolytic activity of (i) after 20 days of ripening. Extracts of cheeses in which starter streptococci were predominant showed high proteolytic activities, and it is considered that lactic acid bacteria play an important role in the formation of low mol. wt. N compounds. [From En summ.] CDP

12 P 1856
Effect of some preservatives on pickled soft cheese.
Ismail, A. A.; El-Hifnawi, M.; Sirry, I.
Journal of Dairy Science **55** (8) 1220-1223 (1972) [10 ref. En] [Dairy Dept., Fac. of Agric., Alexandria Univ., United Arab Republic]

The following preservatives were added to pickling solutions for soft cheeses, manufactured as described previously [FSTA (1972) **4** 6P850]: green pepper (added between cheese pieces); 0.1 or 0.15% sorbic acid; 0.05 or 0.1% sodium benzoate + benzoic acid; and 0.05 or 0.1% H_2O_2. Counts of total bacteria, lactobacilli and coliforms in the cheeses varied with kind and amount of preservative during storage for 12 wk at 10°C. The preservatives had no effect on yield, moisture or fat content of the cheese. Total count was higher in untreated than in preservative-treated cheeses during the 1st 9 wk. Lactobacilli were always more numerous in untreated than in preservative-treated cheeses, although green pepper and H_2O_2 did not retard their growth. Coliforms were not detected after 2 wk storage in the presence of green pepper, 0.15% sorbic acid or 0.1% H_2O_2, after 4 wk in the presence of 0.1% sorbic acid or 0.05 or 0.1% benzoate or in controls, and after 8 wk in the presence of 0.05% H_2O_2. There were more free fatty acids in untreated than in treated cheeses of any age; however, levels in green pepper-preserved cheeses approximated levels in controls. CDP

12 P 1857
[Study of microbiological and biochemical processes of ripening Gruzinskii cheese.]
Lomsadze, R. N.; Kurashvili, I. V.
Molochnaya Promyshlennost' **33** (6) 36-38 (1972) [7 ref. Ru] [Tbilisskoe Otdelenie Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

Average results of periodic analyses of 5 batches of Gruzinskii cheese (the manufacture of which is outlined) taken during ripening for 60 days in whey brine, showed the bacterial count, which was mainly lactic streptococci, to reach a max. of 2.8×10^9/ml after 3 days and to decline finally to 40×10^6/ml, of which 20% were lactobacilli. Titratable acidity increased markedly throughout ripening; pH varied irregularly between 5.15 and 5.30; moisture fell from 49.25 to 46.15%; and the fat/solids ratio fell from 51.95 to 47.85% mainly owing to absorption of 5.65% salt. Soluble N increased from an initial 5.85% of total N to 18.7% of which 64% was non-protein. Main constituents of the 19 amino acids identified in the ripened cheese were: phenylalanine + leucine + isoleucine, 38.7%; valine + methionine, 10.6%; lysine, 8.6%; and alanine, 8.7%. Of the free fatty acids present, acetic (415 ppm) predominated, followed in order at much lower levels by butyric, propionic and formic acids. GTP

12 P 1891
Cheddar cheese flavour. III. The growth of lactic streptococci during cheesemaking and the effect on bitterness development.
Lowrie, R. J.; Lawrence, R. C.; Pearce, L. E.; Richards, E. L.
New Zealand Journal of Dairy Science and Technology **7** (2) 44-50 (1972) [17 ref. En]

'Bitter' strains of lactic streptococci grew rapidly under normal cheesemaking conditions (cooking temp., 37.8°C) and reached high populations in the cheese curd prior to salting, whereas multiplication of 'non-bitter' strains was inhibited by the normal cooking temp. 'Non-bitter' strains were, however, able to multiply throughout cooking when the temp. was reduced to 33.3°C, and reached populations characteristic of 'bitter' strains. Conversely, multiplication of 'bitter' strains could be inhibited by using a higher cooking temp. (39.4°C), and resulting cheeses were less bitter than controls. Bitterness development could also be reduced by bacteriophage action during manufacture. It is concluded that all strains must be potentially capable of contributing directly to the formation of bitter components in the cheese, since high populations of either 'bitter' or 'non-bitter' strains in the curd were invariably associated with bitterness in the cheese. CDP

12 P 1892
Cheddar cheese flavour. IV. A new hypothesis to account for the development of bitterness.
Lowrie, R. J.; Lawrence, R. C.
New Zealand Journal of Dairy Science and Technology **7** (2) 51-53 (1972) [16 ref. En]

As a result of the findings reported in the 3 preceding abstr., a model proposed for the mechanism of development of bitterness in cheese consists of the following 3 major steps: degradation of casein by rennet produces a pool of high mol. wt., mainly non-bitter peptides; some of these peptides are hydrolysed by proteases of starter streptococci to low mol. wt. bitter peptides; these bitter peptides may in turn be further degraded to non-bitter peptides and amino acids by peptidases of starter streptococci. Classification of starter strains as 'bitter' or 'non-bitter' is considered to be arbitrary, all strains being potentially 'bitter' and 'non-bitter'; the incidence of bitterness depends on the ability of the starter strain to multiply under the particular conditions of manufacture. A lower frequency of bacteriophage problems when consistently 'non-bitter' starters are used is attributed to the requirement of actively dividing host cells for phage replication, a condition that will not prevail when the starter strain is inhibited by the cooking temp. CDP

12 P 1920
[Calcium requirements of lactic starter phages.]
Sozzi, T.
Milchwissenschaft **27** (8) 503-507 (1972) [19 ref. Fr, de, en] [Dept. Development Tech., Soc. d'Assistance Tech. pour Produits Nestle SA, Lausanne, Switzerland]

Phages of starter streptococci and lactobacilli were propagated with their homologous hosts for 6 or (for Streptococcus thermophilus) 3 h at optimum temp. in MRS medium [J. appl. Bact. (1960) **23**: 130] with and without Ca^{2+} and in a phosphate-enriched milk medium [Hargrove, J. Dairy Sci. (1961) **44**: 1799]. 3 of 7 Str. lactis and 1 of 3 Str. thermophilus strains were lysed in MRS medium without added Ca^{2+}, and a 2nd Str. thermophilus strain was lysed when incubation was extended to 6 h. All phages were able to lyse their host in MRS + Ca^{2+} except for the phage of 1 Str. lactis strain; this phage was inhibited by phosphate in MRS and Hargrove media, but was able to multiply in milk. Growth of the different host organisms and activities of their phages varied on Hargrove medium. Elimination of Ca^{2+} by the use of phosphates or other means is considered unsuitable for protection against phage attack in the dairy industry. CDP

12 P 1921
Interactions of food starter cultures and food-borne pathogens: lactic streptococci versus staphylococci and salmonellae.
Gilliland, S. E.; Speck, M. L.
Journal of Milk and Food Technology **35** (5) 307-310 (1972) [9 ref. En] [Dept. of Food Sci., N. Carolina St. Univ., Raleigh, 27607, USA]

Factors which may contribute to the antagonistic action of lactic streptococci towards salmonellae and staphylococci in fermented milks are discussed. Factors in addition to the acidic environment created by the streptococci must be involved since pathogens are repressed even when milk is maintained at pH 6.6. Preliminary studies have shown that H_2O_2 accumulation may contribute towards the antagonism, particularly in the early stages of growth; antibiotics such as nisin, produced by certain lactic streptococci, may also be involved. CDP

2 P 1930
Technique of rennet preparation used in the traditional manufacture of Gruyere de Comte and Emmental cheeses.]
Valles, E.; Mocquot, G.
***Lait* 52** (515/516) 259-282 (1972) [20 ref. Fr, en] [Sta. Centrale de Recherches Laitieres et de Tech. des Produits Animaux, CNRZ, (78) Jouy-en-Josas, France]
In this study of the traditional method of rennet preparation Lactobacillus helveticus culture was added to whey that had been heated for 5 min at 75-78°C or deproteinized after heating at 93-95°C; 5-100 g dried vells were added to the whey and were macerated. Extraction at 42°C was found satisfactory for max. yields in 6 h with least loss of rennet. Concn. of rennet obtained was found to depend on pH, temp. and time of extraction, as well as on the amount and quality of vells used. The industrial method (using NaCl) and the traditional method of rennet preparation, using 20 g vells/l., resulted in similar yields of 586 and 530 units of rennet/g, respectively. The traditional rennets, acting also as starter to some extent, retained their activity on freeze-drying and storage at 5°C, or on freezing at -30°C; at pH 3.4-3.8, preparations were stable without the addition of preservatives for about 1 month at 3-5°C. SAC

12 P 1931
[Microbial associations in Roquefort cheese. IV. Inhibitory action of caseolytic micrococci on the openness of the curd.]
Devoyod, J. J.; Desmazeaud, M.; Assenat, L.; Auclair, J.
***Lait* 52** (515/516) 297-310 (1972) [18 ref. Fr, en] [Sta. Centrale de Recherches Laitieres et de Tech. des Produits Animaux, INRA, Jouy-en-Josas, France]
Curd openness (which results from the action of heterofermentative microorganisms, particularly leuconostocs, and is an important factor in the later development of Penicillium spp.) sometimes failed to develop in spite of a normal acidification and presence of a large number of leuconostocs. Failure generally occurred when excessive caseolytic microorganisms were present. 25 strains of caseolytic micrococci isolated from 4 cheese samples did not affect multiplication of 6 Leuconostoc strains in milk but inhibited CO_2 production; filtrates from milk cultures but not those from whey cultures of micrococci inhibited gas production. Substances responsible for the inhibition were separated by gel filtration and identified as peptides rich in aromatic amino acids [see also FSTA (1971) **3** 2P350]. [see FSTA (1972) **4** 1P48 for part III.] CDP

1 H 19
[Determination of lactobacilli and pediococci on solid media.]
Hodan, J.; Augustin, S.
Kvasny Prumysl 17 (3) 49-51 (1971) [5 ref. Cs, en, de, ru] [Zapadoceske Pivovary, n.p., Plzen, Czechoslovakia]
A survey is given of methods for determination of lactobacilli and pediococci, and of brewery laboratory experience with block-shaped, Cryovac-packaged solid nutrient media produced by Sartorius Co. The media, VLB-L41 and VLB-S7 agars, are not completely selective for the microorganisms in question, and microscopic identification of colonies is therefore necessary. The media are currently being tested by incubation of samples of wort, young ripening beer and packaged beer. STI

1 H 50
Hop improvement in the United States.
Horner, C. E.; Likens, S. T.
Wallerstein Laboratories Communications 34 (113) 35-43 (1971) [En, fr, es, de] [Crops Res. Div., Agric. Res. Service, USDA, Corvallis, Oregon 97331, USA]
A description is given of 6 hop varieties currently grown in the USA: Early and Late Clusters, Fuggle, Brewer's Gold, Bullion and Talisman. Production of new varieties by selection of superior types within currently-grown US varieties; introduction of foreign varieties, crossing and selection, and mutation breeding is considered. 4 major criteria, used to evaluate new varieties, are discussed: agronomic suitability; quality; disease and pest resistance; and suitability for brewing. Current new selections showing promise are: 56013, a high yielding disease resistant or tolerant European type, maturing mid season and showing poor storage stability unless refrigerated after harvesting; 62013, a high yielding late maturing (11-13% α-acids) type; and 210001, a 'noble' aroma European type of lower yield but good storage stability. VJG

1 H 107
[Chlorella beverage.]
Urano, T.
Japanese Patent 17 945/71 (1971) [Ja]
Beverage is produced by: suspending fresh Chlorella in water; adding a liquid protease of Bacillus natto to the suspension; decomposing the Chlorella with the protease during autolysis; adding sugar to the liquid extracted from the resultant product with water; inoculating the mixture with lactic acid bateria; culturing the bacteria; and adding sweetening materials, a spice and a dispersion stabilizer to the culture. IFT

1 H 117
[Microbiological investigations of raw coffee, roasted coffee, liquid coffee, and coffee extracts.] Mikrobiologische Untersuchungen an Rohkaffee, Röstkaffee, Flüssigkaffee und Extraktkaffee.
Mohr, E.
Kaffee und Tee Markt 21 (17) 4-5 (1971) [2 ref. De]

Total bacterial counts (TBC), coliform titre, mould and yeast counts were carried out on raw coffee, roasted coffee, liquid coffee, spray-dried coffee extract and coffee infusion. Robusta, unwashed arabica, steamed arabica and caffeine-free raw coffee had TBC of 80 000, 50 000, 60 and 30/g respectively, coliform titres of 1:10+, 0, 0, 0, and mould and yeast counts of 30, 20, 0, 0/g. Fresh roasted coffee, caffeine-free roasted coffee, and 2 samples of retail roasted coffee had TBC of 0, 0, 7-4000, and 0-7000/g respectively, negative coliform titres, and no moulds or yeast. This indicates that bacteria are destroyed by roasting but the coffee is re-infected during handling. 2 samples of spray-dried coffee, and 4 samples of freeze-dried coffee had negative coliform titres, and 5 out of the 6 samples had no moulds or yeasts, with TBC of 0 and 10-100/g for the spray-dried, and 30 000, 30 000, 50, 400-3000/g for the freeze-dried samples. TBC of liquid coffee extract stored for 24 h at 30°C increased from 120/g to 1.8 million/g with development of an unpleasant flavour produced by lactic acid bacteria, but coffee with chicory extract stored under identical conditions retained its initial TBC of 120/g. Yeasts and moulds do not alter the taste of coffee under these storage conditions unless the numbers exceed 2800/ml. Comparative TBC/100 ml infusion were roasted coffee 28 000, liquid coffee 140 000, spray-dried coffee extract 150, and freeze-dried coffee extract 45 000. OA

[H 132
[Problems with diacetyl.] Zum Problemkreis Diacetyl.
Scherrer, A.
Schweizer Brauerei-Rundschau 82 (2) 21-40 (1971) 69 ref. De]

A GLC and electron capture detector method for eparation and quantitative determination of liacetyl and 2,3-pentanedione is described. Acetoin was oxidized with $FeCl_3$ and estimated as liacetyl. The effect of diacetyl 2,3-pentanedione nd acetoin on aroma of beer was examined. Diacetyl concn. of 0.1 mg/l. in light lager beer caused "off flavour", with a butter-like odour and weetish taste. Organoleptically distinguishable concn. of 2,3-pentanedione and acetoin were 1.5 ng/l., and 30 mg/l. respectively. Reduction products of 2,3-pentanedione found in beer are hought to be analogues of acetoin or methyl ethyl etone. It was established that diacetyl and cetoin were reduced in quantitative orrelation to 2,3-butanediol. Formation of liacetyl and acetoin during fermentation occurred imultaneously with reduction of both substances. Oxidation of acetoin to diacetyl was not stablished. Addition of valine inhibited ormation of diacetyl by yeasts, but not by actobacillus and Pediococcus spp. Isoleucine uppressed 2,3-pentanedione formation. Diacetyl, 2,3-pentanedione and acetoin concn. were not nfluenced by the type of beer. No 2,3-entanedione was formed by the lactobacilli, and nly traces by pediococci; 2,3-pentanedione ynthesis by yeasts was more pronounced. ormation of diacetyl by bacteria and yeasts was ifferentiated chromatographically. OA

J 15
Experimental manufacture of sauerkraut in Quebec.]
Delanoe, R.; Emard, L. O.
Quebec Laitier et Alimentaire 30 (7) 11-14 (1971) [Fr]

This study was undertaken to see if good quality sauerkraut could be produced in Quebec Province, using locally grown cabbages, variety 'Penn State'. The cabbage was cut into strips, placed in glass containers with salt (either 2.25 or 2.50% of the wt. of fresh cabbage), and allowed to ferment at 20°C for 4-5 wk. 2 phases of microbial development were noticed during fermentation, the first involving cocci, probably Leuconostoc mesenteroides; the second involving lactobacilli, probably Lactobacillus plantarum and another species. pH was 3.5-3.6, and the sauerkraut was stable and resistant to contamination. The first phase seemed to determine the characteristic taste of sauerkraut and it was important that the temp. was not too high. No significant differences were observed in taste or amount of lactic acid produced between samples treated with 2.25% and 2.5% salt. Tasting experiments were carried out in the Institute canteen and in specialist restaurants and were quite encouraging, indicating that sauerkraut comparable to the imported product can be produced in Quebec. IFlaC

1 J 120
The lactic acid bacteria in connection with the fermentation of vegetables. [A review]
Cho, D. H.
Korean Journal of Food Science and Technology 2 (1) 3-13 (1970) [58 ref. En] [Dept. of Food Tech., Coll. of Agric., Nat. Univ., Seoul, S. Korea]

A review is presented on lactic acid bacteria, with reference to the microbiology of fermented Korean vegetables. Topics covered are taxonomy of lactic acid bacteria; enumeration, isolation and cultivation of lactic acid bacteria, which discusses media used e.g. V-8 medium, sorbic acid-containing media and APT medium; physiology of lactic acid bacteria (sugar fermentation, optimum pH and temp., salt and alcohol tolerance, optical rotation of lactic acid, and accessory growth factors, such as vitamins and amino acids); and changes in the microflora during lactic acid fermentation of vegetables (e.g. effect of salt and brine temp.). JA

1 M 39
Fermentation studies on maize during the preparation of a traditional African starch-cake food.
Akinrele, I. A.
Journal of the Science of Food and Agriculture 21 12) 619-625 (1970) [23 ref. En] [Federal Inst. of Ind. Res., Private Mail Bag 1023, Ikeja, Nigeria]

The important microorganisms of 'ogi' fermentation have been enumerated, isolated and identified. Moulds isolated consist of Cephalosporium, Fusarium, Aspergillus and Penicillium. Of the aerobic bacteria, only Corynebacterium and Aerobacter could be identified. Lactic acid bacteria present were found to be mainly Lactobacillus plantarum. There were also yeasts of which Candida mycoderma, Saccharomyces cerevisiae and Rhodorula were identified. There was indication that Corynebacterium hydrolysed the starch of maize to form organic acids, A. cloacae was shown to be capable of increasing the riboflavine and niacin content of the mash, while L. plantarum was mainly responsible for the production of lactic acid, the main flavour base of ogi. Sacc. cerevisiae and C. mycoderma were also found to contribute to flavour acceptability. AS

1 S 4
Observations of the microflora of vacuum packed sliced cooked meat products.
Mol, J. H. H.; Hietbrink, J. E. A
Mollen, H. W. M.; Tinteren, J., van
Journal of Applied Bacteriology 34 (2) 377-397 (1971) [43 ref. En] [Bact. Lab., Unox N. V., Oss, The Netherlands]

Bacterial contamination of vacuum packed sliced cooked meats occurred mainly on the slicing and packaging line. Various types of these products were examined after packing, after 1 wk storage at 8°C and near the end of their shelf life. From products of 2 brands sampled at the retailer, 153 cultures were isolated and identified. The relative growth rates of most of these strains were determined at 8 and 20°C. Unclassified streptobacteria constitute the most important component of the microflora of vacuum packed cooked meats. With a number of strains, growth experiments in vacuum packed sliced Berliner sausage were made to study the effects of temp., % of brine, pH and nitrate. The shelf life of vacuum packed sliced cooked meats would be improved if contamination with unclassified streptobacteria could be prevented. This presumably could be achieved if cooked meats were handled and sliced in an area strictly separated from raw cured meats. AS

1 S 5
The microbial associations in British fresh sausages.
Dowdell, M. J.; Board, R. G.
Journal of Applied Bacteriology 34 (2) 317-337 (1971) [53 ref. En] [School of Biol. Sci., Univ. of Tech., Bath, Somerset, UK]

British fresh sausages, both pork and beef, contain climax populations consisting of Microbacterium thermosphactum, yeasts, lactobacilli and micrococci is a feature of sausages held at room temp. The rate of growth of the other organisms decreased as the temp. of storage was lowered. The extent of growth of M. thermosphactum was inversely related to the initial load of contaminants of freshly prepared sausage meat. The yeasts appeared to be an independent component of the microbial associations. The growth of lactobacilli was favoured by a heavy initial infection in sausage meat. With the exception of lactobacilli, organisms situated at the surface of the sausage grew more quickly and formed larger populations than those at the centre; the lactobacilli formed populations of about the same size at both locations. There was a slow decrease in pH value (pH 6.8-7.0 to 6.2-6.0) of sausage meat as the microbial associations developed. AS

1 S 65
[Adhesion of mince in frankfurters under various measuring conditions.]
Bashmakov, V. I.; Gorbatov, A. V.; Pakhomov, P. L.; Spirin, E. T.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1971 (1) 107-110 (1971) [4 ref. Ru] [Kharkovskii Inst. Obshchestvennogo Pitaniya, USSR]

The adhesion of mince to solid surfaces was investigated for the relationship between dynamic, geometric and kinematic characteristics of the apparatus and various conditions of experimental measurement (effect of time and pressure of preliminary contact of the material and the area of the adhesion surface). Non-variant characteristics of the mince found were: rate of decrease of the surface of contact; and the coeff. of surface tension. A series of adhesion activities of different materials with respect to mince is also given. STI

1 S 76
Interrupted cooking of beef rib eye steaks.
Korschgen, B. M.; Baldwin, R. E.
Journal of the American Dietetic Association 59 (2) 116-119 (1971) [4 ref. En] [Dept. of Food Sci. and Nutr., Univ., Columbia, Missouri, USA]

Effects of interrupted cooking on the palatability of beef steaks was evaluated. 12 US Good grade beef rib eye steaks (longissimus dorsi) were frozen, sawed into $\frac{3}{4}$ in thick slices individually wrapped in Al foil and stored in a freezer (-15°C). Prebrowned steaks, coated with sauce were subjected to (i) refrigeration for 0 (control), 4 and 28 h or (ii) frozen storage for 1 day, 1 wk,2, 3, 4, and 6 months prior to final cooking in an oven at 500°F (260°C) to an internal temp. of 155°F (68°C). Data from sensory evaluations indicated that all samples were liked (mean score of 6.3 or above on a 9-point scale) regardless of interruption in preparation. Panel scores for flavour showed no significant differences between control, (i) and (ii). Control samples scored significantly better for juiciness, tenderness and general acceptability than frozen samples, but did not differ significantly for these characteristics, from refrigerated samples. A sauce seasoned with ground pepper and lemon juice was preferred to one containing Burgundy wine. VJG

1 T 19
Microbiological spoilage of mayonnaise and salad dressings.
Kurtzman, C. P.; Rogers, R.; Hesseltine, C. W.
Applied Microbiology 21 (5) 870-874 (1971) [33 ref. En] [N. Regional Res. Lab., Agric. Res. Service, USDA, Peoria, Illinois 61604, USA]

Saccharomyces bailii was isolated from two-thirds of the spoiled mayonnaise and salad dressing samples examined. Most of the rest were spoiled by Lactobacillus fructivorans. However, one sample contained large numbers of both Sacch. bailii and L. plantarum. 2 of the spoiled samples also contained small numbers of bacilii. Bacillus subtilis, B. pumilis, B. polymyxa, B. megaterium, and B. licheniformis were found in 1 sample and B. subtilis and B. pumilis in another. Small numbers of B. subtilis and B. licheniformis were also present in 1 unspoiled sample. Several media were evaluated for the isolation of L. fructivorans. Sacch. bailii and L. fructivorans vigorously fermented glucose. The concn. of glucose in spoiled samples ranged from 0 to 38.5 g/kg and from 1.3 to 17.8 g/kg for unspoiled samples. AS

2 B 15
Comparison of selective media for the enumeration of Lactobacillus species.
Gonzales, F. C.; Scheffers, W. A.; Mossel, D. A. A.
Antonie van Leeuwenhoek 37 (2) 262-264 (1971) [12 ref. En] [Tech. Univ., Delft, The Netherlands]

2 selective media for the enumeration of Lactobacillus spp., namely liver infusion sorbic acid agar (Emard & Vaughn (1952), J. Bact. **63**: 487-494) and acetate agar (Rogosa, Mitchell & Wiseman, (1951) J. Bact. **62**: 132-133) were compared. 5 strains of heterofermentative and 2 strains of homofermentative lactobacilli were enumerated using the selective media and 2 non-selective media. Incubation was at 30° C for up to 6 days. Since the liver infusion sorbic acid medium did not support adequate growth of the heterofermentative lactobacilli, the acetate agar was considered superior. MJL

2 E 69
Fermentative preservation.
Unilever Ltd.
British Patent 1 239 765 (1971) [En]

Food products at 60-100°C are deposited into a container, the inner surface of which is coated with an inoculum of a culture of homofermentative lactic acid bacteria such as Lactobacillus bifidus, after which the container is sealed and cooled at a rate sufficient to ensure that at least part of the inoculum remains viable. IFT

2 H 348
[Practical design of a unit for biological acidification and its control.] Über die praktische Gestaltung einer Anlage zur biologischen Säuerung und deren Kontrolle.
Kieninger, H.
Brauwelt 111 (76) 1714-1717 (1971) [2 ref. De, en, fr] [Inst. für Tech. der Brauerei I, Weihenstephan, W. Germany]
Technical aspects of biological acidification during the brewing process are described. The concn. of lactic acid in the stock solution and culture fluids must be estimated by the same technique, preferably by titration with N/10 NaOH, using a pH meter or bromothymol blue as indicator. In-house growth and culture of lactic acid bacteria are described. For acidification of the mash, a max. of 65 g pure lactic acid/100 kg malt are needed. The highest loss of lactic acid during wort boiling was 15 g pure material/hl hopped wort. The unit for production of acidified wort consists of a mixing or a tempering vessel, a culturing vessel and a buffer vessel. TUB-IGB

2 H 352
[Biological problems of bottle washing.]
Voerkelius, G. A.
Birra e Malto 18 (9) 301-305 (1971) [11 ref. It] [St. Brautech. Prüf- und Versuchsanstalt, Weihenstephan, W. Germany]
Insufficient washing of bottles to be used for alcoholic beverages can cause changes in the contents after bottling. A tolerable level of biological spoilage in bottled beer is 0.02%, equivalent to 20 bottles/100 000; a 0.1% incidence equipment to 100 bottles/100 000, indicates defective bottle-washing. Main microorganisms found in washed beer bottles are pediococci, lactobacilli, yeasts and mould. The efficiency of bottle-washing machines depends on the design of the machine, its cleanliness and level of maintenance, the temp. of the soda solution used, the strength of the detergent used and the purity of the water. Chlorine may be used in the washing cycle in amounts of $\leqslant$4 mg/l. The mode of operation of a bottle-washing machine is described. LA

2 J 209
[Process for extending the shelf life of sauerkraut, particularly mechanically packaged sauerkraut.] Verfahren zur Verlängerung der Lagerfähigkeit von Sauerkraut, insbesondere von maschinell abgepacktem Sauerkraut.
Tait, F.
West German Patent Application 1 692 788 (1971) [De]
Conventional sauerkraut is drained and then subjected first to low pressure, e.g. 99.4-99.6% vacuum, and then to high pressure of $\geqslant$5 atm. gauge, each stage lasting ~10 min. Alternatively, the sauerkraut is subjected several times to low and high pressure alternately for short periods. The brine separated out before and during the low-pressure treatment is sterilized by heating to 53°C for ~10 min, inoculated with a sterile culture of lactic acid bacteria, and added to the sauerkraut in the desired quantity. The sauerkraut is then packaged. Nutritionally valuable substances are preserved, and aerobic and anaerobic spoilage bacteria are destroyed by the pressure treatment. W&Co

2 J 226
[Ripe black olives in brine. I. Physico-chemical and microbiological study of fermentation.]
Duran Quintana, M. C.; Garrido Fernandez, A Gonzales Cancho, F.; Fernandez Diez, M. J.
Grasas y Aceites 22 (3) 167-177 (1971) [17 ref. Es, de, en, fr] [Inst. de la Grasa y sus Derivados, Dept. de Chim. y Microbiol., Seville, Spain
4 varieties of ripe black olive (Hojiblanca, Lechin, Nevadillo Blanco and Nevadillo Negro) in brine were prepared in laboratory experimental fermentors and in industrial plants. After considering the main characteristics of the raw material (size, maturity), a microbiological and chemical study of the process was undertaken and characteristics of the product examined. At the beginning of fermentation, non-sporing gram negative bacteria of genera Citrobacter, Klebsiella, Escherichia, Aeromonas and Achromobacter were able to grow, but these were no longer present after 28 days. The chief organisms throughout the fermentation were yeasts. Lactobacilli were present only in variety Hojiblanca. No Clostridium spp. were observed, probably due to the rigid control of pH and NaCl concn. Concn. of reducing sugars and free acidity did not vary appreciably during fermentation. Organoleptic properties (smell, flavour, colour and texture) of both laboratory and industrial products were acceptable. RM

2 L 172
Fermentation process and products useful therein.
Venables, G. S.; Tromp, C.; Dooley, B. J. (Edward L. Bateman Ltd.)
South African Patent 69/6432 (1971) [En]
A sour product containing lactic acid and starch is produced from a lactobacilli-containing, conc. mash of steeped starch. Lactic acid fermentation of the mash is carried out at an elevated temp. until a predetermined pH and/or titratable acidity has been reached. The temp. is then further raised to arrest formation of lactic acid and to gelatinize the unconverted starch. W&Co

3 B 24
Isolation of psychrophilic bacteriophage/host systems from refrigerated food products.
Whitman, P. A.; Marshall, R. T.
Applied Microbiology 22 (2) 220-223 (1971) [21 ref. En] [Dept. of Food Sci. and Nutrition, Univ., Columbia, Missouri 65201, USA]

38 bacteriophage/host systems were isolated from 22 of 45 refrigerated food products examined under psychrophilic conditions. Isolates were obtained from ground beef [11], pork sausage [4], chicken [4], raw skim-milk [2], and oysters [1], but not from liquid egg whites and processed meat products. 30 of the 38 psychrophilic bacterial hosts were Gram-negative rods, and 27 of these were classified within the genus Pseudomonas; 3 were members of the family Enterobacteriaceae. The remaining 8 were Gram-positive cocci, which were tentatively classified as Leuconostoc. Plate counts of psychrophilic bacteria were $>2.2 \times 10^5$/ml (or g) in all but 1 of the samples which contained phage, whereas phage titres ranged from <100 to 6.3×10^6 plaque-forming units/ml (or g). Phage isolates showed limited host ranges, usually attacking only those hosts from which they were isolated. Of 8 phages ested against 13 cultures of known identity, 1 showed lytic action, this being against strains of Ps. fragi. AS

3 B 25
Lactobacilli causing spoilage of acetic acid preserves.
Dakin, J. C.; Radwell, J. Y.
Journal of Applied Bacteriology 34 (3) 541-545 (1971) [18 ref. En] [British Food Manufacturing Ind. Res. Assoc., Randalls Road, Leatherhead, Surrey, UK]

27 cultures of lactobacilli, isolated from 27 packs of spoiled vinegar preserves, which originated from 21 manufacturers and included 12 varieties of product [6 pickled beetroot, 5 tomato ketchup, 4 onions, 2 each of cucumbers, red cabbage and mayonnaise, and 1 each of mixed clear pickles, eggs, mussels, piccalilli, horseradish cream and mint sauce], were examined according to the system of Rogosa & Sharpe and by other tests. One culture conformed to the characteristics of Lactobacillus casei var. casei, 2 cultures to those of L. brevis, 4 cultures to those of L. buchneri, and 20 to those of L. fructivorans. On the basis of the results and an examination of the literature it is suggested that L. trichodes is a synonym of L. fructivorans. AS

3 G 139
[Accelerated microbiological fermentation process for the production of acidified food products.]
Beschleunigtes mikrobiologisches Gärverfahren zur Herstellung gesäuerter Nahrungsmittel.
Schuler, R.
West German Patent Application 2 007 785 (1971) [De]

A nutrient solution containing lactose, e.g. whey or milk, and 0.5-2.0% growth activator, e.g. yeast autolysate and yeast extract, is inoculated with non-gas-forming thermophilic lactobacteria, particularly bifidobacteria and/or thermophilic lactobacilli. After its addition to a prepared food product, e.g. cabbage, herrings or gherkins, the whole is incubated at 35-45°C for 24-48 h to effect complete fermentation. The rapid acidulation prevents the growth of spoilage organisms. The process is also applicable to some varieties of fruit and meat. W&Co

3 H 415
[Simplified biological yeast analysis.]
Vereinfachte biologische Hefeuntersuchung.
Dachs, E.
Brauwelt 111 (80) 1782-1786 (1971) [2 ref. De] [Doemensschule, München-Gräfelfing, W. Germany]

A new package is described for shipping yeast samples, which permits sterile removal and processing of the yeast while excluding the possibility of biological changes in the sample during shipment. Sterile Al foil with indentations for the yeast is removed from a sterile plastics envelope, dipped into the sample, returned to the envelope, the part of the foil which had been touched torn off, and the envelope reclosed by means of its snap seal. The yeast does not dry out during normal shipment, and can be posted in an outer protective envelope. A description is also given of a modification to the Weinfurtner technique for determination of Sarcina and lactic acid bacteria in brewers' yeast [see Weinfurtner, F. (1957) Richtlinien für Hefereinzucht, Biologische Brauereibetriebskontrolle, Desinfektionsmittelprüfung, Verlag Hans Carl, Nuremberg, W. Germany], enabling 1-stage separation and capture of the bacteria using a Sartorius filter aid. Also described is a simplification to the method of identifying Sarcina with the aid of VLB-S-7 medium [see Emeis, C. C. (1969) Monatsschrift für Brauerei **22** (1) 8-11], by incorporation of an anaerobic vessel with connections for vacuum pump and CO_2 infeed. TUB-IGB

3 H 430
[Characteristics of some lactic acid bacteria isolated from wines from the Dealul Mare vineyard in Valea Calugareasca.] In "Microbiologia. Vol. I." [Conference proceedings]
Bidan, P.; Lepadatu, V.

pp. 653-661 (1970) [20 ref. Ro, fr] Bucharest, Roumania: Societatea de Stiinte Biologica [Inst. de Cercetari pentru Viticultura si Vinificatie, Valea Calugareasca, Roumania]

29 strains of lactic acid bacteria were isolated from 15 samples of Valea Calugareasca wine obtained in 1967 and 17 samples obtained in 1968; 3 of the strains were cocci. 2 strains of cocci and 3 strains of bacilli most widely represented were identified as Leuconostoc oenos [see Garvie, J. gen. Microbiol. (1967) 48 (3) 431-438], Pediococcus cerevisiae, Lactobacillus hilgardii, L. plantarum and L. casei var. casei. SKK

3 H 450
[Fermentation of higher carbohydrates in wort.]
Vergärung höherer Kohlenhydrate in der Würze.
Emeis, C.-C.
Monatsschrift für Brauerei 24 (11) 310-313 (1971) [5 ref. De, en] [Inst. für Gärungsgewerbe & Biotech., Berlin, Germany]

Fermentation of higher carbohydrates in the wort can be applicable to production of special beers. As normal brewer's yeast only ferments wort sugars up to the trisaccharides, which change dextrins into fermentable sugars, other methods must be used. In principle, the following 3 methods are possible: addition of a cold water extract of malt to the fermenting wort; use of a special yeast with the ability to ferment dextrins; use of lactobacilli which can hydrolyse higher carbohydrates. The 3 methods were compared using gel-chromatography. With a malt cold water extract apparent final attenuations of >100% were achieved, but the level was affected by the culture yeast used, and special yeast strains were required. Fermentation of wort dextrins with a dextrin-fermenting special yeast was particularly simple, but non-fermentable residual carbohydrates remained, although the apparent final attenuation was ~100%. Fermentation with a mixture of lactobacilli and culture yeast, as used for example in the production of Berlin White Beer (Berliner Weissbier), gave a product extremely low in carbohydrates. The high final attenuation was a result of the combined activities of the lactobacilli and the culture yeast. TUB-IGB

3 J 412
Microbial flora of pecan meat.
Chipley, J. R.; Heaton, E. K.
Applied Microbiology 22 (2) 252-253 (1971) [11 ref. En] [Dept. of Food Sci., Univ. Coll. of Agric., Expt. Sta., Experiment, Georgia 30212, USA]

All bacterial and fungal flora on (i) commercially shelled and (ii) aseptically shelled pecan meats, were isolated and identified. (i) and (ii) were stored at 4 C until microbiologically examined. Sterilization of (ii) was with 1.0 mM $HgCl_2$. A medium of aseptic trypticase soy agar was used for isolation of the bacteria, and a 2% (w/v) agar (Difco) medium was used for isolation of fungi. (i) and (ii) were also examined for penetration of fungal hyphae by examining thin (25 nm) sections of pecan meat previously impregnated with liquefied paraffin wax for 48 h. (i) Contained Pseudomonas effusa, Corynebacterium paurometabolum, Escherichia coli, Leuconostoc mesenteroides, Proteus vulgaris, Aerobacter aerogenes and Clostridium spp. No bacteria were found in (ii). Penicillium notatum, Aspergillus clavatus, A. niger, Fusidium spp. and Tricothecium spp. were found in (i). In (ii) Aspergllus clavatus and Tricothecium were identified. No penetration of fungal hyphae was observed, although this can occur in commercially shelled pecan meat. PA

3 M 351
[Production of dough for bread.]
Szalai, L.; Bogdan, J.; Kohegyi-Margittai, J.; Moor, J.; Szilli, M.
Sütöipar 18 (2) 40-47 (1971) [Hu] [Sütöipari Kutatointezet, Dombovari ut 5/7 ,Budapest XI, Hungary]

Pilot plant experiments have shown that under conditions prevailing in Hungary, a special leaven concentrate could be used for dough preparation. This concentrate is produced from wheat flour type BL 112 at 35 C with a ripening period of 8 h using 1% of yeast (flour wt. basis), dried and converted to a powder. A 2:1 mixture of the powdered leaven and powdered whey (prepared from whey of 6% DM content inoculated with lactic acid bacteria, fermented and conc. to 60% DM) is acidifed with 10% acetic acid and added to the dough in an amount of 3%. A commercial dough formulation is presented which proved to be economical for bakeries producing 3 tonnes bread/16 h. IF

3 M 376
[Reduced bacterial contamination in bakers' yeasts production.]
Kozlova, M. A.; Kobrina, Yu. P.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya 1971 (2) 82-85 (1971) [12 ref. Ru] [Leningradskii Mezhotraslevoi Nauchno-issled. Inst. Pishchevoi Promyshlennosti, USSR]

The antibacterial activity of a range of chemical substances was studied in bakers' yeasts production. The highest antibacterial effect was found with 0.02% furazolidone. Reduction of spore-forming bacteria in the culture amounted to 58% and of lactic acid bacteria to 62%. Addition of furazolidone to the fermentation medium increased the yield and improved the quality of the yeasts. Neomycin and polymyxin (10 units/ml) reduced the count of spore-forming and lactic acid bacteria. Nisin was particularly effective against lactobacilli. The antibiotics improved the yield and baking quality of yeasts. Of the alkaline detergents which did not reduce the yield of yeast the best have proved to be trisodium phosphate and sodium hexametaphosphate (0.1%). GIPCH-200 a highly effective antimicrobial paste, dosed in 0.01% amounts, impaired the quality of the yeast. STI

3 N 133
[Microorganisms in margarine affected by spoilage. II. Isolation and identification of species: bacteria.]
Castanon, M.; Inigo, B.
Microbiologia Espanola 24 (1) 49-65 (1971) [21 ref. Es, en]

Bacteria isolated from samples of spoilage-affected margarine [see preceding abstr.] were studied. Gram- and catalase-positive strains (4 strains) were identified as Staphylococcus aureus and Staph. epidermidis; lactic acid bacteria (2 strains) as Lactobacillus plantarum; Gram-negative bacteria (7 strains) as Zymomonas mobilis. HBr

3 N 164
[Preparation of margarines.]
Feron, R.
Annales d'Hygiene de Langue Francaise. Medecine et Nutrition 7 (3) 45-58 (1971) [Fr]

The sources and types of fats and oils used in the manufacture of margarine are summarized and their extraction, purification, hydrogenation, transesterification and fractionation are described briefly. The aqueous phase may be water, skim milk or a mixture of milk and water. The milk may be inoculated with lactic acid bacteria to flavour the margarine. Otherwise diacetyl is added. Other additives (legislation permitting) include emulsifiers, salt, colour, antiseptics and antioxidants. The process of preparing a suitable emulsion of the fat and aqueous phase is described, and packaging, storage and transport are considered briefly. MEG

3 S 283
[Lactobacilli and related microorganisms in meat and meat products. IV. The ecology of lactobacilli, Leuconostoc species and pediococci.]
Laktobazillen und eng verwandte Mikroorganismen Fleisch und Fleischwaren. IV. Die Okologie von Laktobazillen, Leuconostoc-Species und Pediocokken
Reuter, G.
Fleischwirtschaft 50 (10) 1397-1399 (1970) [18 ref. De, en, fr] [Bitterstrasse 8-12, 1000 Berlin 33, W. Berlin, Germany]

To establish the ecology of meat products, groups, spp. and biotypes of organisms present in fresh meat, dry sausages in several stages of production and pre-packed and vacuum-packed meat products were determined quantitatively. It was found that in all products a broad association of strains existed with only in rare cases a dominant sp. Atypical streptobacteria of some biotypes, L. plantarum and L. farciminis occurred frequently in dry sausages. In all products streptobacteria outnumbered lactobacilli, pediococci and Leuconostoc sp. It is stated that only atypical streptobacteria, L. farciminis and L. viridescens sp. halotolerans possess an ecological specificity for meat products. [See FSTA (1971) 3 8S962 for Parts I & II & 12S1468 for Part III.] FWJ

3 S 551
Modern developments in pig meat curing. [A symposium]
Patton, D.
IFST Proceedings 4 (3, part II) 155-162 (1971) [27 ref. En] [Ulster Curers' Assoc., Belfast, UK]

It is noted that permitted amount of nitrate in cured meat products ranges from 2000 ppm in Australia and the Netherlands to 150 ppm in France, and that of nitrite from 500 ppm in the Netherlands to zero in Germany. Pig breeding has concentrated on fat:lean ratio, light shoulder, long back and lean plump ham. Backfat thickness has decreased from 40.5 mm in 1926-27 to 23.4 mm in 1968-69, and body length has increased from 889 mm to 964 mm. A tendency towards pale soft exudative muscle in leaner carcasses has been noted, but effects of this can be minimized by correct ante mortem treatment. Mechanization of slaughter and processing has proceeded rapidly, with chilling capacity of the carcasses being the limitation to throughput. A "thermocure" process involving processing and curing of hot pigs has been reported, with the main advantages being savings in time and space. Curing technology has concentrated on reduction in the curing or maturation period, and increased yield of product from the raw material. Injecting pickle into the carcass before dry curing, reduction in time of immersion in a tank from 2-3 wk to 7-10 days, artery pumping of brine, development of an automatic brine injector, the "tumbling" technique, and slice curing are examples of how this has been brought about. Vacuum packing of cured meats has altered spoilage microflora found from Micrococcus, Vibrio, Acinetobacter and Alcaligenes to the lactic acid bacteria. Food poisoning due to Staphylococcus aureus is possible in vacuum packed bacon stored at >25°C

Preference for milder cured bacon has resulted in the product becoming microbiologically more unstable. Action of some additives (ascorbic acid, polyphosphates) on the product is mentioned. Future developments of the industry are briefly discussed. PG

3 S 336
[Lactobacilli and closely related microorganisms in meat and meat products. V. Lipolytic activity (splitting of tributyrin).]
Laktobazillen und eng verwandte Mikroorganismen in Fleisch und Fleischwaren. V. Lipolytische Aktivitäten (Tributyrinspaltung).
Reuter, G.
Fleischwirtschaft 51 (1) 67-70 (1971) [De, en, fr]
[Inst. für Lebensmittelhygiene, Freie Univ., Berlin, Germany]

Using tributyrin as a test substrate, the lipolytic activity of lactobacilli and related organisms isolated from meat and meat products was examined by the modified agar stab method of Fryer, Reiter and Lawrence [J. Dairy Sci. (1967) **50**: 388-389]. It was found that the lipolytic activity varied between bacteria types and also within individual strains of bacterial species. The most marked activity was noted in heterofermentative species; strong activity was also noted in atypical streptobacteria and enterococci obtained from dry sausages. Typical streptobacteria and pediococci generally possessed no lipolytic activity. The method used is reasonably rapid and results obtained were reproducible. Lipolytic bacteria are involved in aroma production and spoilage in meat. [See FSTA (1972) **4** 3S283 for part IV.] FWJ

4 B 35
[Studies on citric acid fermentation by Aspergillus niger and lactic acid fermentation by Lactobacillus acidophilus using mixed strain cultures.]
Takami, W.
***Journal of the Fermentation Association of Japan [Hakko Kyokai-shi]* 28** (11) 447-450 (1971) [3 ref. Ja]

4 H 582
[Problem of detection of contamination of sweetened mineral water with Leuconostoc mesenteroides.]
Weberova, M.; Polster, M.; Hunkova, M.
***Prumysl Potravin* 22** (11) 347-348 (1971) [5 ref. Cs] [Univ. J. E. Purkyne, Brno, Czechoslovakia]

Leuconostoc mesenteroides is known to cause deterioration of mineral waters sweetened by syrup addition. It is concluded from tests with Seitz-filtered sweetened Ondrasovka mineral water, artificially contaminated with L. mesenteroides, that microbiological evaluation is the best method of detecting the presence of the microorganism but that photometric density measurement and viscosity measurement using the Ostwald viscometer are also useful. The possibility of a serological test is considered. SKK

4 H 603
[Malolactic fermentation in wine. IV. Determination of the presence of bacteria during or after alcoholic fermentation.] Der biologische Säureabbau im Wein. IV. Untersuchungen zum Auftreten der Bakterien während bzw. nach der alkoholischen Gärung.
Wejnar, R.; Wartenberg, H.
***Mitteilungen: Rebe, Wein, Obstbau und Früchteverwertung* 21** (1) 32-42 (1971) [40 ref. De, en, fr, es] [Friedrich Schiller Univ., Jena, E. Germany]

The effect of alcohol, acidity and temp. on bacteria and malolactic fermentation in wine was investigated with Fröhlig-Silvaner must. Bacterial growth (Bacterium mannitopoeum and Micrococcus acidovorax) was dependent on sugar and alcohol concn., content of tartaric acid and pH; at 110°C Oechsle and pH <3.2 inhibition of bacterial growth was evident. At relatively low sugar and alcohol contents and pH 2.8, strong bacterial growth occurred. Spontaneous growth of bacteria paralleled the degree degradation of malic acid; in wines with high malic acid concn. no bacteria can develop. Partial degradation of malic acid may be attributable to delayed bacterial growth. It is concluded that the date of degradation of malic acid is essentially dependent on the final content of alcohol and pH. [See also FSTA (1971) **3** 3H317.] JMS

4 J 583
[Microflora in brine-cured mushrooms.]
Fedotova, V. E.; Tsernikel', A. E.
***Konservnaya i Ovoshchesushil'naya Promyshlennost'* 26** (3) 34-35 (1971) [Ru]
[Novosibirskii Inst. Sovetskoi Torgovli, USSR]

Microbiological activity and quality of mushrooms in brine and effect of microflora on the organoleptic characteristics of mushrooms were studied in 1969-1970 during 6-months storage at 0-5°C, or higher. After a month's storage, analysis of brine showed lactic and acetic acid bacteria, putrefactive bacteria, enterobacteria and yeast-type microorganisms to be present. One ml of the brine after 6-month storage, contained 180 000-480 850 lactic acid bacteria; after one month the average count was 600 000. Good quality mushrooms contained 0.55-0.90% lactic acid after 6 months, whereas in inferior quality mushrooms the content was only 0.30-0.45%; after one month the lactic acid content was 0.99%. The lower content of this acid is explained by surface growth of yeasts and Oospora lactis and by growth of butyric acid bacteria in the brine, all of which utilize the lactic acid. Due to high acidity and well-aerated media the butyric acid bacteria did not have any effect during the initial storage period. Towards the end of the storage period with lower acidity and after O_2 had been used up by the aerobes, the butyric acid bacteria started to grow virulently. Number of acetic acid bacteria decreased throughout storage and none were detected at the end of the storage period. At the start of the observation the coli-titre was 0.01 ml, and 10 ml at the end. Common types of Escherichia coli were identified. Putrefactive bacteria identified were Bacillus subtilis, Proteus vulgaris, Bacillus polymyxa. STJ

4 J 608
[Microbiological evaluation of salted mushrooms.]
Fedotova, V. E.
***Konservnaya i Ovoshchesushil'naya Promyshlennost'* 1971** (5) 32-33 (1971) [Ru] [Novosibirskii Inst. Sovetskoi Kooperativnoi Torgovli, USSR]

Total microbial count was determined by: (i) culturing brine on meat-peptone agar in Petri dishes for 3 days, and (ii) by fluorescence microscopy using fluorochrome acridine orange. Number of microorganisms/ml of brine determined by (i) and (ii) respectively were: first quality, 151 000, 10 780 000; second quality, 375 000, 20 666 000; substandard, 306 000, 24 242 000. In first quality salted mushrooms, for every 50 bacilli, there were 8-11 cocci and 2-5 yeasts. These increased to 20-70 and 18-30 respectively in substandard mushrooms. Mushrooms of satisfactory quality contained 0.86-0.90% lactic acid and 318 000-480 000 lactobacilli/ml brine, with substandard mushrooms lactic acid decreased to

Total microbial count was determined by: (i) culturing brine on meat-peptone agar in Petri dishes for 3 days, and (ii) by fluorescence microscopy using fluorochrome acridine orange. Number of microorganisms/ml of brine determined by (i) and (ii) respectively were: first quality, 151 000, 10 780 000; second quality, 375 000, 20 666 000; substandard, 306 000, 24 242. In first quality salted mushrooms, for every 50 bacilli, there were 8-11 cocci and 2-5 yeasts. These increased to 20-70 and 18-30 respectively in substandard mushrooms. Mushrooms of satisfactory quality contained 0.86-0.90% lactic acid and 318 000-480 000 lactobacilli/ml brine, with substandard mushrooms lactic acid decreased to 0.39% and number of lactobacilli to 180 000. H_2S formation increased with the activity of putrefying bacteria and the quality of the salted mushrooms deteriorated. STI

4 J 630
Growth rates and fermentation patterns of lactic acid bacteria associated with the sauerkraut fermentation.
Stamer, J. R.; Stoyla, B. O.; Dunckel, B. A.
***Journal of Milk and Food Technology* 34** (11) 521-525 (1971) [10 ref. En] [St. Agric. Expt. Sta., Dept. of Food Sci. & Tech., Cornell Univ., Geneva, New York 14456, USA]

Effects of pH and NaCl concn. on growth rates of 5 spp. of lactic acid bacteria commonly associated with sauerkraut fermentation were determined in filter-sterilized cabbage juice. Growth rates of all cultures, with the exception of Pediococcus cerevisiae, were retarded by addition of salt, lower pH, or interaction of both pH and salt. Based upon lag and generation times, P. cerevisiae was the culture most tolerant to pH and salt concn. employed, whereas Streptococcus faecalis was the most sensitive species. Of the heterofermentative cultures, Lactobacillus brevis was less subject to growth inhibition than Leuconostoc mesenteroides. Under conditions simulating those found during initial phases of sauerkraut fermentation (2.25% salt, pH 6.2), L. mesenteroides displayed shortest lag and generation time of all cultures examined. This rapid growth rate coupled with a marked

4 P 594
[Increasing the proteolytic activity of X-ray mutants of lactic bacteria. (In "Proceedings of Inter-University Dairy Conference".)] In "Sbornik dokladov mezhvuzovskoi konferentsii po molochnomu delu".
Dilanyan, Z.; Makaryan, K.; Ioanisyan, T.; Sarkisyan, R.; Akopyan, A.

4 S 389
[Development of lactic acid microflora and changes in lactic acid content of raw Roumanian salami during air-conditioned ripening.] In "Microbiologia. Vol. I."
Constantinescu, C.; Stanculescu, C.
pp.739-743 (1970) [9 ref. Ro, fr] Bucharest, Roumania: Societatea de Stiinte Biologica [Inst. de Cercetari Alimentare, Bucharest, Roumania]

Values are tabulated for lactobacilli counts in outer and inner parts of Sibiu type salami determined at intervals during air conditioned ripening for 100 days and subsequent storage for a further 100 days, as well as corresponding values for moisture and lactic acid contents. Lactobacilli counts rose from $\sim 10^3$ microorganisms/g in the mix to $\sim 10^9$/g on the 8th day after manufacture and decreased slowly thereafter to $\sim 0.5 \times 10^5$/g at the end of storage. Values for lactic acid content were 0.99% in the mix, 0.76% on the 17th day after manufacture (max.) and 0.60% at the end of storage. SKK

4 T 205
Lactic fermented malt flavour.
Hollenbeck, C. M. (Red Arrow Products.)
United States Patent 3 615 697 (1971) [En]
A dry powdered additive for supplying malt flavour and lactic sourness to starch-based foods is produced by anaerobically fermenting an aqueous dispersion of malt flour, preferably in whey, with a lactic acid-producing microorganism removing the water, and grinding the product to a flour. IFT

4 T 224
[Microorganisms involved in the maturation of shoyu (soy sauce).] [A review]
Yoshii, H.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] **66** (7) 675-678 (1971) [28 ref. Ja] [Res. Inst. Food Ind., Aichi, Nagoya, Japan]
Detailed descriptions are given of Saccharomyces rouxii, involved in the main fermentation process, Torulopsis spp., which assist maturation, and yeasts which assimilate levulinic acid. Relationships between these yeasts and halophilic lactic acid bacteria are also discussed. YN

5 B 47
Microbiology of locally canned foods
Paterno, V. A.; Gopez, M. D.
Philippine Journal of Nutrition **23** (1) 21-31 (1970) [8 ref. En] [Food Res. Lab., Food & Nutr. Res. Centre, Herran-Taft Ave., Manila, Philippines]
209 cans of locally produced meat, fish, vegetable, fruit, milk, fermented and miscellaneous products were examined visually for can defects, incubated at 37°C or 55°C before opening and then examined visually, the pH determined, and analysed microbiologically. 45 cans (21.53%) were found to contain viable organisms, mostly spore-forming bacilli. Leuconostoc was found in green peas, and Staphylococcus in fermented black beans. 82.4% of fermented products contained viable organisms, 22.85% of meat products, 19.35% of vegetable products, and 7.32% of fruit products. Fish, milk and miscellaneous products were virtually sterile. Only 3 cans showed evidence of spoilage of the contents after incubation; these were pancit lomi (a meat product), pimientos and tomato sauce. No consistent relationship between pH and presence of bacteria was found. The microbiological quality of locally canned foods was considered comparable to similar products manufactured abroad. PG

5 G 220
Abstracts of papers presented at First Annual Research Conference on Food Science and Technology (Cork, July 13 and 14, 1971/.
Anon.
Irish Journal of Agricultural Research **10 (3)** Supplement xiipp. (1971) [En]
Abstracts of the following papers are included: The extracellular protease of Bacillus polymyxa, by P. J. Griffin & W. M. Fogarty (p. ii); Extracellular enzymes of Streptomyces diastaticus, by M. T. Taaffe & W. M. Fogarty (p. ii); Studies on the assay of diacetyl in milk, by T. M. Cogan (p. iii); Effect of storage at different relative humidities on the survival of microorganisms in milk powder, by F. O'Connor 6(p. iii); Hydrogen peroxide production in agitated cultures of/ lactic streptococci, by M. I. Keane & S. Condon (pp. iii-iv); Anomalies in the statutory turbidity test for conventionally sterilized milk, by A. C. O'Sullivan (pp. iv-v); Factors influencing the heat stability of preheated milk systems, by F. O'Mahony & P. A. Morrissey (p. v); Applications of the Milko-Tester in the dairy industry, by T. C. A. McGann (pp. v-vi); Isolation and characterization of bovine pepsin, by P. A. O'Leary & P. F. Fox (p. vi); Factors influencing the proteolysis of casein by rennin, by J. Guiney & P. F. Fox (p. vii); Improving the spreadability of butter, by J. Phelan (p. vii); Influence of processing on the emulsion stability of cream, by J. Brady & J. Foley (pp. vii-viii); The role of some environmental circumstances in photocatalysed oxidation of butter, by C. M. Cooney, J. Gleeson & J. Foley (p. viii); Residence time measurement on a UHT sterilizer and its use in rheological studies on milk, by E. O'Callaghan & B. McKenna (p. viii); Production of viscous UHT cream, by M. K. Keogh (p. viii). [Continued in following abstr.] NdeV

5 G 221
Abstracts of papers presented at First Annual Research Conference on Food Science and Technology (Cork, July 13 and 14, 1971).
Anon.
Irish Journal of Agricultural Research **10** (3) Supplement xiipp. (1971) [En]

[Continued from preceding abstr.] Effect of level of nutrition on milk composition, by P. A. Gleeson (p. ix); Production of mycelial protein foods from waste agricultural products, by R. A. M. Delany (p. ix); Food yeast production on industrial wastes with special reference to the peat industry, by A. J. McLoughlin (p. ix); Antibiotic sensitivity of lactic acid bacteria, by T. M. Cogan (p. x); Enzymatic basis of rapid post-mortem glycolysis in porcine skeletal muscle, by J. J. A. Heffron (p. x); A comparison of discoloration of six muscles in samples of prepacked fresh beef, by D. E. Hood (p. xi); Factors contributing to the toughness of meat, by R. L. Joseph (p. xi); A comparison of three 'breeds' of cattle for the production of 'stores' and for the dead meat trade, by T. F. Raftery & S. F. O'Donovan (pp. xi-xii); and Carboxylic ester hydrolases (lipases and esterases) in bovine milk and mammary gland, by W. K. Downey (p. xii). NdeV

5 H 751
The microbiology of brewing. [A review]
Kleyn, J.; Hough, J.
Annual Review of Microbiology **25**: 583-608 (1971) [252 ref. En] [Dept. of Biol., Univ., Puget Sound, Tacoma, Washington, USA]

This comprehensive review covers the subject under the headings: historical, organization of the brewing industry, literature of brewing, teaching and research in the industry, bacteria encountered in breweries (lactic acid, coliform, acetic acid, Obesumbacterium proteus, Zymomonas anaerobia), wild yeasts, outline of traditional brewing processes, outline of advanced brewing processes, microbiology of brewing materials, selection and propagation of brewers' yeast, yeast management, growth and metabolism, growth and fermentation kinetics, yeast cell wall, brewing yeast genetics, microbiological control in brewing, fermentation, and packaging including sanitation, aseptic packaging. HBr

5 H 770
[Histamine content of wines.] Untersuchungen zum Histamingehalt in Weinen.
Mayer, K.; Pause, G.; Vetsch, U.
Mitteilungen: Rebe, Wein, Obstbau und Früchteverwertung **21** (4) 278-288 (1971) [34 ref. De, en, fr, es]

282 wines, chiefly of Swiss origin, were analysed for histamine content, pH and presence of bacteria; results are tabulated. The average histamine content was 3.8 mg/l. for red wines and 1.1 mg/l. for white wines. 54% of the red wines and 15% of the white wines displayed a histamine content ≥2 mg/l.; 21 wines contained ≥10 mg/l. At higher pH values, a tendency for higher histamine concn. was observed, in particular in red wines. The bacteriological findings showed that the histamine formation was due mainly to lactic streptococci. AS

5 H 781
Microflora of fermenting palm sap.
Faparusi, S. I.; Bassir, O.
Journal of Food Science and Technology (Mysore) 8 (4) 206 (1971) [1 ref. En] [Dept. of Biochem., Univ., Ibadan, Nigeria]

Unpasteurized palm sap was left for 7 days at room temp. (25°C) and at 12 h intervals the number of viable microorganisms estimated by dilution plate count on appropriate media. A graph illustrates the succession of different microorganisms. Lactobacillus and Leuconostoc spp. were active during the early stages; also yeast I group, consisting of Saccharomyces cerevisiae predominated. From the 3rd day another set of yeasts, designated as yeast II, consisting of Schizosaccharomyces pombe, Pichia spp. and Candida mycoderma started appearing. Acetobacter spp. began to appear after 48 h and steadily increased; also species of Aspergillus, were extracted quantitatively in the range of 0.15-3.75, 0.25-6.25, 0.40-10.00 and 0.20-5.00 mg/100 ml respectively. The alcohol content of both the test and standard solutions must be brought to the same level before CS_2 extraction. Reduced quantity of CS_2 should be used for extracting small amounts of esters. Comparative determinations on 6 brandies and 3 wine distillates showed the following % loss for CS_2 and ether extraction respectively: capronate 26-86 and 51-93%; caprylate 93-109 and 86-98%; caprinate 88-114 and 87-106% laurate 70-110 and 93-94%. Large discrepancies in the amounts of capronate were due to an interfering compound in the ether extract. Recovery tests of CS_2 extracts with model brandy and wine distillate gave 100-107 and 98-104% capronate, 95-100 and 99-102% caprylate, 98-100 and 98-102% caprinate, and 99-102 and 99-104% laurate. Owing to formation of emulsions, wines could not be examined directly but by means of distillates produced after fortification to 20-25 vol. % alcohol. It is concluded that the CS_2 extraction method shows all-round superiority over gas chromatography. RM

5 J 648
Fermentation of green olives by thermophilic lactic acid bacteria at a temp. of 37-40°C.
Balatsouras, G.; Papamichael, V.; Eldin, N.
Grasas y Aceites **22** (5) 357-366 (1971) [18 ref. En, de, es, fr] [Coll. of Agric., Div. of Agric. Ind., Votamico, Athens, Greece]

The use of thermophilic lactic acid bacteria for fermenting green olives at high environmental temp. was investigated. Green olives of variety Conservolea were lye-treated and washed in the usual way, packed into glass jars, filled with brine (9.88% NaCl), inoculated with a mixed culture of Streptococcus thermophilus and Lactobacillus bulgaricus and incubated at 37-40°C. The brine was supplemented with glucose and tomato juice. Under these conditions, olives underwent a rapid lactic fermentation completed in ~20 days, when max. acidity (0.819-1.026 g lactic acid/100 cc of brine) and constant pH (3.90-4.00) was reached. Conversion factor of sugars to lactic acid was ~0.6-0.73 (compared to 0.3-0.5 for mesophilic lactic acid bacteria). Fermentation followed its normal route without formation of butyric or formic acid or other undesirable by-products. Salt concn. remained low throughout fermentation (4.74-5.97%). A thermoduric yeast related to Candida guillermondii was found in all samples. The final product was comparable to that fermented by mesophilic lactic acid bacteria except for slightly darker brine. The process seemed promising for early delivery of the product and for warm climates. RM

5 J 659
[Process for the biological production of lactic acid-fermented, powdered or shredded vegetables or fruit for use as a food product ingredient.]
Verfahren zur Herstellung von weiterverarbeitungsfähigen milchsauren Trockenpulvern und -schnitzeln aus Gemüse, Obst und Südfrüchten auf biologischem Wege.
Vitanova-Anstalt für elektrische und physikalische Geräte
West German Patent Application 2 000 458 (1971) [De]

Fruit, vegetables, etc. are cleaned and blanched at 50-60°C to destroy undesirable bacteria, the blanching water containing minerals to prevent osmotic extraction of the minerals contained in the product. After addition of Lactobacillus acidophilus or L. bifidus, the product is subjected to lactic acid fermentation at 0.5-1.0 atm. gauge, to pH 4.0-4.3. The vegetable etc. is then freeze-dried, shredded, or pulverized, and sterilized by IR radiation or brief heating at 60-70°C. The product is for addition to pastes, sandwich spreads, jam, dried vegetables, sausages etc. W&Co

5 M 514
[Utilization of soaked hard bread in thin leaven.]
Plotnikov, P. M.; Kazanskaya, L. N.
Khlebopekarnaya i Konditerskaya Promyshlennost' **15** (8) 11-12 (1971) [Ru] [Leningradskoe Otdelenie Vses. Nauchno-issled. Inst. Khlebopekarnoi Promyshlennosti, USSR]

Use of 5% soaked hard bread and 20% flour (on total flour wt. basis) in leaven for rye bread manufacture was studied. A table summarizing quality indicators demonstrates that with a higher proportion of lactic acid bacteria in thin leaven containing soaked bread, the leaving and fermenting activity of such leaven was more intense than in leaven containing no bread. Higher proportions of flour in the leaven accelerated the dough leavening process; the same applied with an increase in temp. to 32°C. Under these conditions, soaked bread added to leaven (not to dough as originally recommended) can be successfully utilized in bread production. STI

5 S 532
[Additives, adjuvants, and residues in meat and meat products.] Zusatzstoffe, Hilfsstoffe und Rückstände in Fleisch und Fleischwaren.
Mirna, A.
Wiener Tierärztliche Monatsschrift **58** (11) 396-402 (1971) [35 ref. De, en] [Bundesanstal für Fleischforschung, Inst. für Chemie und Physik, Blaich 4, D-865 Kulmbach, W. Germany]

The topic is reviewed under the following headings: additives and adjuvants (foreign proteins, and nitrites, nitrates and smoking); pesticide residues (organochlorine compounds, possibilities for decontamination of foods, and review of the contamination situation); and contamination from industry (e.g. with Pb and Hg). JA

6 H 887
[Use of lactic acid bacteria in the production of bottled champagne.]
Ivanova, I. P.; Bashtanaya, I. I.; Goncharenko, G. V.
Sadovodstvo, Vinogradarstvo i Vinodelie Moldavii **26** (6) 25-26 (1971) [Ru] [Moldavskii Nauchno-issled. Inst. Sadovodstva, Vinogradarstva i Vinodeliya, USSR]

The effect of lactic acid bacteria on the champagne production process was investigated. Bacteriological analyses were carried out on samples taken from the raw material, from the basic mixture, after the 2nd fermentation stage and during storage; water used to rinse bottles and stoppers was also analysed for bacterial count and samples were taken from bottles before filling. The samples were cultivated on agar. 100 different cultures were found, and there was a marked predominance of hetero-fermentative organisms (65 out of 72) in the champagne. A series of 7 points for successful champagne production is appended. STI

6 R 302
[Effect of edible and mineral acids in the preservative effect of sodium formate.] Über den Einfluss von Genuss- und Mineralsäuren auf die konservierende Wirkung von Natriumformiat.
Scheer, H.
Archiv für Fischereiwissenschaft **22** (3) 263-279 (1971) [4 ref. De, en] [Inst. für Biochem. und Tech., Bundesforschungsanstalt für Fischerei, Hamburg, German Federal Republic]

Respiration activities (manometric measurement) of Escherichia coli at neutral pH were not inhibited by sodium formate in 148 mg/100 g concn. Increasing concn. in the acid range inhibited respiration of E. coli (pH of culture medium 5.6) and decarboxylase activity of Betabacterium buchneri at pH 4.5. Degree of inhibition depended on sodium formate concn. (74, 148, 222 mg/100 g), the particular acid used to adjust the pH value of the medium e.g. formic, acetic, lactic, tartaric, citric, hydrochloric, sulphuric or phosphoric acid, and interactions between acids and sodium formate. IN

6 S 773
[Effect of microbial metabolites on organoleptic and biochemical properties of hams. I.]
Mikhailova, A. K.; Marushkina, V. I.; Mikhailova, M. M.; Likhonosova, N. D.; Ludanova, N. V.; Ovchinnikova, L. P.
Proceedings of the European Meeting of Meat Research Workers **16B**: 353-360 (1970) [6 ref. Ru]

Tests were carried out using Lactobacillus plantarum, Streptococcus lactis, Micrococcus caseolyticus and Achromobacter guttatum cultures. Ham broth containing 16% salt, 0.075% nitrite and 0.5% sugar was used as a growth medium. Hams injected at 18-20°C with brine containing these microorganisms and their metabolites, gave the best results on organoleptic evaluation. STI

7 B 68
[Microbiological and technological aspects of food quality.] Mikrobiologische und technologische Gesichtspunkte der Lebensmittelqualität.
Klaushofer, H.
Ernährungs-Umschau **18** (11) 459-465 (1971) [13 ref. De] [Inst. für Lebensmitteltech., Hochschule für Bodenkultur, A-1180 Vienna, Gregor-Mendel-Str. 33, Austria]

Technological aspects of processing; factors affecting quality of food between harvest and consumption (e.g. temp., light, O_2, heavy metals, H ion concn., enzymes, microorganisms); organoleptic, chemical, physical, hygienic and nutritional-physiological properties; freezing; dehydration; and sterilization are reviewed and generally discussed, together with natural infection of foods, bacterial multiplication and re-infection during processing and handling, and preventative measures. Graphs are given showing the relationships between sterilization time, temp., and bactericidal effect, inactivation of enzymes, and retention of vitamins and colour. A table lists the significance of various qualitative concn. of ≡gram-negative rods (fermenters and non-fermenters), cocci (catalase positive and negative), lactobacilli, bacilli, fungi, and yeasts, and of pH values with reference to spoilage of fresh meat, boiled salami, fruit, fruit juices, dry vegetables, flour, and cocoa. Presence of bacteria in foods as a cause of disease, a salmonellosis outbreak in Switzerland in 1968, and a typhoid epidemic in Aberdeen in 1964 are briefly mentioned. OA

7 H 1046
Effect of pH on malo-lactic fermentation in wine.
Bousbouras, G. E.; Kunkee, R. E.
American Journal of Enology and Viticulture **22** (3) 121-126 (1971) [19 ref. En] [Dept. of Viticulture & Enology, Univ., Davis, California 95616, USA]

Wine prepared from Pinot noir and Malbec grapes inoculated with Saccharomyces cerevisiae was adjusted to pH 3.1-3.8 at intervals of 0.1, using conc. HCl. Malo-lactic fermentation was induced by introduction of Leuconostoc oenos. Rate was assessed by qualitative detection of malic acid by ascending paper chromatography. Chemical analyses were carried out on the sterilized wine. Rate of malo-lactic fermentation was found to be directly proportional to initial pH. Increases of up to 0.2 pH units occurred; increases were greater at higher initial pH values. Decreases in titratable acidity were greater in the middle of the range of initial pH. Most lactic acid produced was of the L(+)-isomer. Greater diacetyl and acetoin contents and volatile acidity were associated with malo-lactic fermentation, but there was no clear effect of pH on their production. PG

7 H 1084
Bacterial spoilage in dry red wine and its relationship to malo-lactic fermentation.
Rankine, B. C.; Bridson, D. A.
***Australian Wine, Brewing and Spirit Review* 90** (3) 44, 46, 48 & 50 (1971) [En] [Australian Wine Res. Inst., Glen Osmond, Australia]

Results of investigations into bacterial spoilage in dry red wines are summarized, and a review is given of the symptoms of spoilage, procedures for laboratory examination, nature of spoilage and bacteria involved, and relationship to malo-lactic fermentation. Procedures for diagnosing and treating infected wines and for preventing future spoilage are set out for the winemaker. Spoiled red wine was usually a light dull red tending towards brown, contained ver little SO_2 and had pH values >3.8. Bacteria responsible were species of the genera Pediococcus, Leuconostoc, Lactobacillus and Streptobacterium. Recommendations for preventing bacterial spoilage include prevention of the occurrence of stuck fermentations, maintenance of a suitable level of SO_2, encouragement or prevention of malo-lactic fermentation as required, maintenance of a reasonable acidity, early racking, pasteurization and general sanitation and hygiene. PG

7 J 1129
[Discoloration of sauerkraut caused by fermentation problems.] Verfärbungen von Sauerkraut infolge Fermentationsschwierigkeiten. [A lecture]
Steinbuch, E.
***Industrielle Obst- und Gemüseverwertung* 56** (11) 311-315 (1971) [13 ref. De] [Sprenger Inst., Wageningen, The Netherlands]

A review is given of technological and microbiological investigations into the problem of sauerkraut discoloration. Topics reviewed are: grey and pink discoloration; possible connections between pink discoloration and development of yeasts of the strain Saccharomyces exiguus; effect of addition of sorbic acid on discoloration during fermentation of sauerkraut; ascorbic acid in sauerkraut and its relation to the discoloration problem; discoloration and fermentation temp.; theories on the causes of pink discoloration; stagnation in the growth of lactic acid bacteria, due to shortage of nutrients in the raw white cabbage caused by the growing conditions; possible role of K and Mn content of white cabbage in discoloration. JMS

7 J 1150
[Green and turning olives in brine. I.]
Borbolla y Alcala, J. M. R. de la; Gonzalez Pellisso, F.; Gonzales Cancho, F.
***Grasas y Aceites* 22** (6) 455-460 (1971) [6 ref. Es, de, en, fr] [Inst. de la grasa y sus Derivados, Sevilla, Spain]

Effects of pasteurization and of NaCl concn. on fermentation of olives in brine was investigated. Fermentation in 6% NaCl was encouraged by previous pasteurization of olives at 74°C for 3 min, producing >1.25% acidity. Growth of gram-negative organisms was inhibited and of lactobacilli encouraged by pasteurization, especially when combined with addition of 0.1N sodium lactate. In the absence of heating or after 15 min at 50°C, fermentation was chiefly caused by yeasts. Pasteurization produced a certain amount of softening and appearance of white spots under the skin due to colonies of lactobacilli. Treatment at 50°C did not produce any alterations. Olives of variety Gordal fermented equally well at 3, 5 or 8% NaCl concn., varieties Manzanilla and Hojiblanca much better at low concn. (3% NaCl). RM

7 J 1170
[Microbiological analysis of freeze-dried purees and juices containing pulp.]
Tsvetkova, L. M.; Popovskii, V. G.; Prokhorovich, L. E.; Shenderovskaya, L. M.
***Konservnaya i Ovoshchesushil'naya Promyshlennost'* 1971** (1) 32-34 (1971) [Ru] [Moldavskii Nauchno-issled. Inst. Pishchevoi Promyshlennosti, USSR]

In 1968/1969 microbial resistance of freeze-dried purees, pulp and juices made from blackcurrants, sour cherries, apples, plums, apricots and strawberries, stored for 6-12 months under a variety of conditions, was tested. The products were made from sterilized raw materials; addition of sugar, and filling into hermetically sealed plastics and metal plate containers was carried out under the strictest sanitary conditions. 1 g of product contained, in most cases, 0.1×10^3-1×10^3 microbes; the highest count detected was 3×10^3 microbes. 85% of samples contained surviving spore-forming bacteria of species Bacillus, 60% samples contained Micrococcus, 12% contained Lactobacillus, 5% samples contained yeasts, 3% Streptococcus and Staphylococcus, and 15-20% yeast spores. During storage under a variety of conditions, the microbial count was 0.2×10^2-9.2×10^2 in 1 g in juices; in purees the count was 2×10^2-1.6×10^3 in 1 g. Total microbial count was reduced by 10-86%. Rehydrated juices kept for 6 h at 18-37°C showed no quality deterioration due to microorganisms. STI

7 S 840
A note on the aerobic microflora of fresh and frozen porcine liver stored at 5°C.
Gardner, G. A.
Journal of Food Technology **6** (3) 225-231 (1971) [4 ref. En] [Ulster Curers' Assoc., 2 Greenwood Avenue, Belfast BT4 3JL, UK]

Comparative studies were made of frozen and unfrozen porcine livers stored either in air or in polyethylene bags at 5°C. Microbiological contamination was predominantly on the surface. Storage at 5°C in air resulted in a proteolytic type of spoilage caused by Gram-negative bacteria such as Alcaligenes spp. and Pseudomonas spp.; Escherichia spp., Microbacterium thermosphactum, and lactic streptococci were also detected. The level of contamination was higher in the 'drip' of samples stored at 5°C in polyethylene bags, and this appears to be related to the surface contamination of the liver; the souring type of spoilage when stored in a polyethylene bag, was associated with a predominance in the flora of lactic streptococci and Leuconostoc spp. Freezing was not found to change the spoilage characteristics. AB

7 T 388
[Antibacterial activity of sorbic acid.] Zur antibakteriellen Wirkung der Sorbinsäure.
Wallhäusser, K. H.; Lück, E.
Deutsche Lebensmittel-Rundschau **68** (2) 39-44 (1972) [20 ref. De, en, fr] [Farbwerke Hoechst AG. Frankfurt (Main)-Höchst, German Federal Republic]

In view of the known anti-fungal effect of sorbic acid in preserved foods, its antibacterial effect was investigated. Liquid culture medium was inoculated with a bacterial suspension of 10^6 cells and the extinction read after 24 h incubation at pH 6 and 7 and the rate of growth compared with controls. Extinction curves were also plotted in relation to concn. of potassium sorbate and time (2-14 days). Inhibition of bacteria at 300-700 mg/ml was demonstrated. Escherichia coli and Aerobacter aerogenes required lower concn. than Staphylococcus aureus and Pseudomonas aeruginosa. Least effect was exerted on Lactobacillus arabinosus. In no instance has sorbic acid enhanced bacterial growth. The results confirm that the antibacterial activity of sorbic acid is not of such universal character as its anti-fungal activity. Significant anti-bacterial activity, especially against bacterial flora of faecal origin, was nevertheless shown. OA

8 H 1174
[Formation of volatile aroma compounds by microorganisms.] Die Bildung flüchtiger Aromastoffe durch Mikroorganismen.
Niefind, H. J.; Späth, G.
Proceedings. European Brewing Convention **13**: 459-468 (1971, publ. 1972) [7 ref. De, en, fr] [Splügen Brauerei, Varese, Italy]

The object was to examine the effect of spoilage organisms on beer aroma using model brews in which formation of volatile aroma compounds was followed by gas-chromatography. Since several contaminating substances at exceedingly low concn. can impart undesirable aroma and flavour, special methods including use of a flame-ionization detector, an electron-capture detector and, for volatile S compounds, a selective and highly sensitive flame-photometer detector were applied. Organisms investigated were those especially harmful in brewing and included a wild Saccharomyces diastaticus, Pediococcus, Lactobacillus and Flavobacterium. Fermentations were carried out on micro-scale using EBC fermentation tubes modified for gas-chromatographic sampling. Pediococcus and Lactobacillus had an adverse effect on beer aroma due to formation of diacetyl. 2,3-Pentanedione was formed only in traces by Pediococcus whilst Sacch. diastaticus produced both in almost equal amounts. Formation of volatile S compounds, particularly ethyl mercaptan and dimethyl sulphide, in addition to phenols, is characteristic of Flavobacterium. On account of their extremely low threshold values, S compounds contribute significantly to aroma of spoiled beer. The other organisms examined are capable of forming volatile S compounds. Sacch. diastaticus spoils beer aroma by production of alcohols and esters. Trials were carried out in which pitching yeast and wort were infected. From these trials the max. possible quota of infection by foreign organisms without detriment to wort was determined. Results underline the need for biological control of production. AS

3 H 1204
Brewery spoilage micro-organisms.
Richards, M.
Brewers' Digest **47** (2) 58-59 & 62-64 (1972) [21 ref. En] [Bass Production, Ltd., Burton-on-Trent, Staffordshire, UK]

The restricted range of bacteria capable of causing problems in a brewery include Obesumbacterium proteus, Acetobacter/Acetomonas, Zymomonas, Lactobacillus und Pediococcus spp. Tests for genus and species identification are briefly described and evaluated. Difficulties of identifying yeast contaminants, particularly wild Saccharomyces, have been eased by the introduction of the immuno-fluorescent technique, which is discussed. The main advantage of this method is that results can be available the same day instead of after 2-7 days necessary for most microbiological tests). Membrane filtration will probably be used to concentrate cells before the immuno-fluorescent method is carried out. A micro-colony method can be used to accelerate membrane filtration and aid identification of yeasts. PG

8 H 1210
[Sake preservation.]
Eisai Co. Ltd.

Degradation of sake due to the presence of Lactobacillus organism is prevented by incorporation of lysozyme or its salts, together with p-hydroxybenzoic esters. IFT

3 J 1297
[Ripe black olives in brine. II. Physicochemical and microbiological study of fermentation.]
Garrido Fernandez, A.; Duran Quintana, M. C.; Gonzalez Cancho, F.; Fernandez Diez, M. J.
Grasas y Aceites **23** (1) 22-31 (1972) [18 ref. Es, de, en, fr] [Inst. de la Grasa y sus Derivados, Seville, Spain]

Ripe black olives in brine from 3 varieties (Lechin, Hojiblanca and Verdial) were prepared in laboratory experimental fermentors and industrial plants. The main characteristics of the raw material and chemical and microbiological character of the product sampled daily during laboratory fermentation, and at intervals during industrial manufacture, are shown in tables. In all cases, microbial flora consisted chiefly of yeasts, which were responsible for fermentation. No clostridia were observed in any sample. Non-spore forming gram negative bacilli disappeared after 15-17 days except in one industrial fermentation in a through previously used for lye-cooking green olives. Leuconostoc and Pediococcus spp. were obtained only from variety Hojiblanca. Fermentation on a laboratory scale proceeded in a similar manner to the industrial process but was much more costly. Variety Verdial was suitable for the production of black table olives except for its late ripening. [See FSTA (1972) **4** 2J224 for part I.] RM

8 J 1435
Control of fermentation in vegetable sauce.
Gupta, G. K.; Dan, A.; Anand, J. C.
Indian Food Packer **25** (5) 5-8 (1971) [11 ref. En] [Div. of Horticulture & Fruit Tech., IARI, New Delhi, India]

The main ingredient of vegetable sauce is yellow pumpkin (Cucurbita moschata), others include gur, starch, salt, cheap condiments, acetic acid and sodium benzoate. Market samples of vegetable sauce were found to vary considerably in chemical composition and quality, and all the samples were found to be undergoing fermentation. Vegetable sauce was prepared by a commercial method and was found to ferment even in the presence of 1.5% acetic acid and 0.1% sodium benzoate (permissible limit for sodium benzoate is 900 ppm). However, when the sauce was boiled for $\geq$10 min in the presence of 0.5% acetic acid, the spore forming lactobacilli associated with the fermentation were inactivated. The sauce thus processed could be preserved safely with 750 ppm sodium benzoate. AB

8 M 957
The sugars of flour and their involvement in the San Francisco sour dough French bread process.
Saunders, R. M.; Ng, H.; Kline, L.
Cereal Chemistry **49** (1) 86-92 (1972) [10 ref. En] [W. Marketing und Nutr. Res. Div., USDA, Berkeley, California 94710, USA]

No sugars are added in the making of San Francisco sour dough French bread. Therefore it is of interest to determine sources and types of carbohydrate utilized by the 2 microorganisms recently reported to be involved in this process [see FSTA (1971) **3** 9M1052 & 9M1053]. The principal carbohydrate available, ~5.5% maltose based on dry wt. of flour, is produced after the flour-water mixture is formulated, presumably by amylase action on free starch. Flour itself contributes ~1.7% of additional carbohydrates other than maltose. The sour dough bacterium, a previously undescribed Lactobacillus, utilizes only ~56% of maltose, conveniently leaving the remainder as a necessary ingredient in crust browning. The sour dough yeast, Saccharomyces exiguus, which does not utilize maltose, consumes virtually all the flour carbohydrates including glucose, fructose, and 2 families of glucofructans; $glucose_1$-$fructose_n$ (where $n = \geq 4$). The contribution of yeast to acidity produced (lactic and acetic) is shown to be negligible. AS

8 S 965
[Bacterial contents of uncooked sausage spread (mettwurst) and their influence on quality evaluation.] Keimgehalte streichbarer Rohwürste (Mettwürste) und sich daraus ergebende Aspekte für die Beurteilung.
Kniewallner, K.; Prändl, O.
***Alimenta* 1971**: Special issue. Foods of animal origin 14-17 (1971) [4 ref. De] [Inst. für Fleischhygiene, Fleischtech., & Lebensmittelkunde, Tierärztliche Hochschule, Vienna, Austria]

106 commercial samples of mettwurst from 11 plants were examined for organoleptic quality, pH and contents of aerobic bacteria, coliforms, enterococci, lecithinase-positive staphylococci, lactobacilli and yeasts. Significant differences between plants were found in the counts of enterococci (10^2-10^7, mean 5.5×10^3/g) and lecithinase-positive staphylococci (uncountable-10^4, mean 1.8×10^2/g but 45 samples uncountable). Counts for other genera did not differ significantly. 2 samples were not acceptable by sensory evaluation but did not differ in bacteriological quality. Only one sample contained sulphite-reducing anaerobes, and only a few spore-forming aerobes. During storage tests at 5° and 20°C up to 130 days, bacterial counts fell slightly (negative correlation coeff., low regression coeff. between storage time and bacterial counts). Aerobes, coliforms and lecithinase-positive staphylococci fell at both storage temp. while enterococci behaved irregularly. Both odour and flavour remained good. Bacterial flora did not differ significantly from that of uncooked dry sausage. RM

8 S 999
[Ability of microorganisms occurring in meat and meat products to form porphyrins.]
Untersuchungen über das Porphyrinbildungsvermögen von in Fleisch und Fleischwaren vorkommenden Mikroorganismen. [A thesis]
Müller-Prasuhn, G.
58pp. (1969) [58 ref. De] Hanover, German Federal Republic: Tierärztliche Hochschule

13 spp. of Enterobacteriaceae, 2 of Pseudomonadaceae, 10 of Bacillaceae, 8 of Lactobacteriaceae and 2 of Micrococcaceae, 28 of which were from the collection of the Veterinary High School in Hanovedr and 7 from the collection of the Robert Koch Institute in Berlin, were tested as pure or mixed cultures on different media for ability to synthesize prophyrins or form them from myoglobin precursors. The findings are presented in detail. SKK

9 F 429
[Utilization of plastics materials and their effect on the quality of meat products.]
Anon.
***Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Myasnoi Promyshlennosti* 24**: 136-147 (1970) [Ru]

Polyethylene film and cellophane were used to wrap meat cuts, and ensured a shelf-life of 2-3 days at 2-5°C and 85-87% RH. Packaging under vacuum impaired the appearance of the product due to drainage of liquid from meat, but enabled it to be stored for 8-9 days under the same conditions. Plastics packaging materials reduced weight losses, and retarded bacterial growth with the exception of lactic acid bacteria. Mention is also made of long-fibre synthetic wrappers for packaging smoked meat products and of use of epoxy resins for anti-corrosion coating of processing equipment. STI

9 H 1350
[Biological resistance of the brewer's yeast Saccharomyces carlsbergensis to bacteria.]
Brzozowska, M.
***Prace Instytutow i Laboratoriow Badawczych Przemyslu Spozywczego* 21** (3) 353-372 (1971) [13 ref. Pl, ru, en, de] [Inst. Przemyslu Fermentacyjnego, Warsaw, Poland]

14 strains studied were Bratislava B-S, Radberger, 48-22, SK-I, Gdansk and Gwa, with biological resistance to Lactobacillus, Pediococcus and E. coli types; the Vratislavice M, Heinecken A, SK-I and Smichov S with biological resistance to the 2 bacterial types Pediococcus and E. coli; the Fürth, Holesovice B, 218 K, strains were not resistant to any of the 3 above types of bacteria. Lack of antagonism of the yeast to the bacteria caused an increase in diacetyl, acetaldehyde and total acidity in wort. The yeast strains characterised by shorter fermentation period and higher fermentation rate of the wort exhibited higher resistance to bacterial infection. The 158 K strain was resistant only to E. coli. STI

9 H 1431
[Detection of hiochi bacteria in sake.]
Ikemi, M.; Ninchoji, N.; Wada, T.; Izumi, K.; Izumitani, T.
***Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 66** (8) 794-798 (1971) [7 ref. Ja, en] [Tech. Centre, Tax Administration Bureau, Sendai, Japan]

Distribution of hiochi bacteria, (sake-spoilage bacteria) was examined in 117 samples of fresh sake (20% alcohol) obtained from 58 breweries in the Tohoku District in 1970. The original and diluted samples (15% alcohol) were incubated at 25°C for 30 days. Spoilage occurred in 4 of the oroginal and 20 of the diluted samples. Hiochi bacteria were detected in 31 samples; 11 of them contained genuine hiochi bacteria, 2 contained hiochi-type lactobacilli, and 6 contained both types of organism. YN

9 H 1457
[Experience gained in studying the biological stabiiity of beer.]
Tolar, J.; Savel, J.
***Kvasny Prumysl* 18** (3) 52-54 (1972) [4 ref. Cs, ru, en, de] [Jihoceske Pivovary n.p., Ceske Budejovice, Czechoslovakia]

The effect of filtration and the level of sanitation of the processing equipment on keeping quality of beer was studied. To ensure a constant high standard of equipment sanitation, an important factor for improving the stability of beer, it is recommended that a selective medium containing iodoacetic acid and crystal violet be used for the determination of contaminant yeasts, and a modified Nagakawa media be used for lactobacilli and pediococci. STI

9 H 1470
[Microbiological analysis during shochu production. I. Microflora of mash made from sweet potato and rice koji.]
Tamaoka, T.; Tanabe, I.; Kobayashi, T.; Obayashi, A.; Matsumura, E.
***Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 66** (8) 810-815 (1971) [16 ref. Ja] [Fac. Agric., Univ., Kagoshima, Japan]

So-called 'potato shochu' is made from cooked sweet potato and rice koji. Micrococcus and Leuconostoc spp. were found in numbers ranging from ~10^3 to 10^4/g in rice koji inoculated with Aspergillus kawachii, an acid-producing mould, 1 day after inoculation, but they had almost disappeared 2 days after incubation. In moto-mash, yeast starter (a pure culture of Saccharomyces cerevisiae) which had been added to the mash at concn. of 5×10^6/ml predominated initially suppressing the growth of 'wild' organisms such as Candida and Bacillus spp. which had propagated in rice koji. In the main mash, heterofermentative lactic acid bacteria, such as Lactobacillus buchnery and L. betadelbruckii were found in numbers of ~10^3/ml. Their number declined, however, towards the end of fermentation, when the alcohol concn. of the mash reached ~14.6%. [See following abstr.] YN

9 H 1471
[Microbiological analysis during shochu productio. II. Microflora of the mash made from uncooked white rice bran and rice koji.]
Tamaoka, T.; Tanabe, I.; Kobayashi, T.; Obayashi, A.; Matsumura, E.
***Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 66** (8) 816-818 (1971) [4 ref. Ja]

Uncooked white rice bran can be used as source of starch for making shochu. As it contains many undesirable microorganisms, microbiological control of mash incubated with it is important. In moto mash, Leuconostoc and Candida spp. which had grown in the rice koji were almost eliminated by the high acidity produced by Aspergillus kawachii during koji preparation. The main mash, to which the moto mash was added with raw white rice bran, contained lactic acid bacteria such as Lactobacillus brevis, L. betadelbruckii, and L. acidophilus in numbers up to 2×10^3/ml (in total). Microbiological control of the main mash is considered important in view of the presence of L. acidophilus in the mash in numbers ~10^3/g. [See preceding abstr.] YN

9 H 1472
[Microbiological analysis during shochu production. III. Microflora of the mash made of uncooked white rice bran and a koji prepared with uncooked white rice bran.]
Tamaoka, T.; Tanabe, I.; Kobayashi, T.; Obayashi, A.; Matsumura, E.
***Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 66** (9) 893-896 (1971) [7 ref. Ja] [Res. Inst. Brewing, Takinogawa, Kita-ku, Tokyo, Japan]

Uncooked white rice bran (WRB) was mixed with a suitable amount of hot water and inoculated with Aspergillus kawachii to make a koji preparation. During preparation of the koji, Brevibacterium, Pseudomonas, Aerobacter, and Bacillus spp. which had existed in the raw WRB increased to 5×10^{10}/g. Acid-labile lactic acid bacteria (LAB), such as Leuconostoc and Candida spp., were also found in the koji preparation (~2×10^4/g), but most were reduced in numbers during moto mash incubation. In the second mash, which was prepared by addition of raw WRB to the moto mash, heterofermentative LAB such as Leuc. betadelbruckii and Leuc. buchneri increased to 1.1×10^5/ml. In the third mash, which was prepared by adding raw WRB to the second mash, homofermentative LAB, such as Lactobacillus acidophilus, predominated, amounting to 2.4×10^5/ml. Mash showing bacterial growth was susceptible to spoilage. [See preceding abstr.] YN

9 H 1475
[Method for continuous cold sterilization of wine using electrophysical procedures.]
Avakyan, B. P.
Prikladnaya Biokhimiya i Mikrobiologiya 5 (5) 601-606 (1969) [10 ref. Ru. en] [Inst. of Viticulture, Winemaking & Horticulture, Erevan, USSR]

A water-cooled hermetically sealed chamber is described in which a static or flowing layer of wine is exposed under inert gas to ultrasonic radiation from 4 magnetostrictive generators in the bottom part of the chamber and to UV radiation from 8 lamps suspended from the roof. Optimal conditions of sterilization established in experiments with Lactobacillus plantarum. Acetobacter aceti, Saccharomyces vini and wild yeasts added in pure culture to pasteurized must or wine were: irradiation time, 5-9 sec; wine layer thickness, 2.5-5 mm; throughput, 400-600 l./h; UV intensity, 40 000-90 000 erg/mm^2; ultrasonic radiation, frequency 20 kHz, anode tension 7.3 kV. Continuous treatment proved more effective than batch treatment. Contaminated commercial wines of different types were (i) pasteurized or (ii) treated by cold sterilization. Marked increase in numbers of microorganisms occurred in (i) 15-20 days after treatment, whereas wines subjected to (ii) were sterile after 2 months. No differences were found between (i) and (ii) in titratable acidity, contents of volatile acids, alcohol, sugars or aldehydes; (ii) caused some reduction in contents of tannins and pigments and replacement of glycolic acid by fumaric acid. Taste, bouquet and stability of (ii) treated wines were better than of (i) treated wines. SKK

9 M 1048
[Method for preparation of wheat flour dough.]
Shcherbatenko, V. V.; Nemtsova, Z. S.; Kuz'minskii, R. V.; Stolyarova, L. F.; El'kin, S. I.; Patt, V. A.; Paskhina, L. A.; Kramynina, A. A.; Rzaev, R. I. (**Union of Soviet Socialist Republics**, Vsesoyuzni Nauchno-issledovatel'skii Institut Khlebopekarnoi Promyshlennosti)
USSR Patent 327 915 (1972) [Ru]

In making bread by simultaneously preparing separate portions of dough with and without yeast, then mixing these and the remaining ingredients and allowing the mixture to stand for a short time, the lactic acid portion is prepared by cultivating lactic acid bacteria on a mixture of flour, water, enzyme preparations and other ingredients, and all portions are allowed to stand for some time before mixing. The yeast portion is preferably prepared at 30 - 32°C and allowed to stand for 1 - 2 h. The yeast-free portion is prepared at 24 - 28°C and allowed to rise for 1 - 3 h, and the lactic acid portion is prepared at 30 - 32°C and allowed to acidify for 2 - 4 h. W&Co

9 R 400
[Hygienic evaluation of herring paste.]
Chmielowski, W.; Trebusiewicz, B.; Wartenberg, L.
Medycyna Weterynaryjna **28** (3) 167-169 (1972) [12 ref. Pl, ru, en]

Samples of 8 batches of herring paste described in the preceding abstr. were each divided into 3 parts which were respectively examined bacteriologically (i) immediately, (ii) after storage at 0-2°C for 72 h, or (iii) after storage at 14-18°C for 72 h. Ranges for bacterial counts or titres were for (i)-(iii) respectively: total bacteria, 1.7×10^7-3.4×10^7, 9.1×10^6-2.1×10^7, and 1.7-4.0×10^7/g; coli titre, 10^{-3}-10^{-5}, 10^{-1}-10^{-3}, and 10^{-3}-10^{-6}; enterococci titre, 10^{-1}-10^{-3}, none in 0.1-10^{-3}, and 10^{-2}-10^{-4}; anaerobes titre, 10^{-1}-10^{-2}, none in 0.1-10^{-2}, and 10^{-1}-10^{-2}; coagulase positive staphylococci, none in 0.1-1100, none in 0.1-500, and none in 0.1-1200/g; Proteus, 40-280, 20-100, and 60-420/g; lactic acid bacteria, 220-1580, 100-1610, and 420-1680/g; lipolytic bacteria, 610-1600, 290-680, and 580-2140/g; yeasts, 1100-1400, 700-5020, and 1900-9400/g; moulds, 270-1640, 160-1300 and 940-2020/g. Salmonella-Shigella organisms were never detected. It is concluded that hygiene of herring paste production should be improved, and that the paste should have a storage life in retail trade under refrigeration of ≤36 h. SKK

9 S 1203
[Lactobacilli and closely related micro-organisms in meat products. VI. Proteolytic enzyme activity.]
Laktobazillen und eng verwandte Mikroorganismen in Fleisch und Fleischwaren.
Reuter, G.
Fleischwirtschaft **51** (6) 945-952 (1971) [18 ref. De, en, fr] [Inst. für Lebensmittelhygiene der Freien Univ., 1000 Berlin 33, Bitterstrasse 8-12, German Federal Republic]

Representative strains of lactobacilli and allied microorganisms isolated from meat and meat suspensions were examined for their behaviour towards complex protein substrates. Their growth and amino acid accumulation in a synthetic nutrient medium and from high and low molecular protein breakdown products was investigated in a liquid culture medium containig tryptone ("oxoid" tryptically broken down casein), meat extract and yeast extract, in unheated meat suspension and in a filtrate prepared from it. The following results (which are tabulated) were obtained: no acidification or coagulation of milk; no liquefaction of agar; no haemolysis of blood agar (with or without glucose); good growth in meat suspensions; in synthetic medium only L. casei, L. plantarum and some atypical Streptobacteria gave good growth; good growth of all tested strains was obtained after addition of tryptone. It is concluded that the organisms examined have only slight proteinase activity. [See FSTA (1972) 4 3S336 for Part V.] RM

10 B 96
[Process for the culture of microorganisms, and applications.]
Larebeyrett, J. de
French Patent Application 2 062 866 (1971) [Fr]
A culture medium for thallophytes contains trace elements and 0.001-0.200% of an enzyme-vitamin-amino acid complex containing: α- or β-amylase; ⩾1 of 1,6-glucosidase, hexokinase, amylomaltase, phosphorylases, xylonase and Schardinger's enzyme; methionine and other amino acids; ⩾1 vitamin. The medium is particularly suitable for Lactobacillus plantarum, L. bifidus, L. bulgaricus, Streptobacillus thermophilus, ascomyces, e.g. Torula and Saccharomyces cerevisiae, and blastomyces. Application is to fermentation in brewing and bread-making, and production of dietetic foods for children, etc. W&Co

10 H 1525
[Changes in microflora during takju brewing.]
Shin, Y. D.; Cho, D. H.
1558df **8** (2) 53-64 (1970) [23 ref. Ko, en] [Dept. of Food Tech., Coll. of Agric., Seoul Nat. Univ., Suwon, Korea]
Microflora changes were studied at 24 h intervals from the start to the 6th day of takju (Korean rice wine) fermentation. The yeast Torulopsis inconspicua, probably a contaminant, was the predominant constituent of the yeast flora of non-inoculated laboratory brewed takju. Kokja (a starter) appeared of no value as the yeast source for takju fermentation. Inoculation of Saccharomyces cerevisiae into the mash at a concn. of 10^7/ml at the start of fermentation caused great changes in the microflora, eliminating natural contaminant yeasts, lactic acid bacteria, and bacilli. KoSFoST

10 H 1556
[Vitamin and amino acid requirement of lactic acid bacteria from wine and vine leaves.] Vitamin- und Aminosäurebedarf von Milchsäurenbakterien aus Wein und Rebenblättern.
Weiller, H. G.; Radler, F.
Mitteilungen: Rebe, Wein, Obstbau und Früchteverwertung **22** (1) 4-18 (1972) [31 ref. De, en, fr, es] [Inst. für Mikrobiol. & Weinforschung, Johannes Gutenberg-Univ., Mainz, German Federal Republic]
61 strains of lactic acid bacteria were isolated from wine and vine leaves; these were classified generally as Pediococcus, Leuconostoc and Lactobacillus, on the basis of their morphology and CO_2 production from glucose. Detailed species classification is given. Most strains were also to metabolize malic acid. Valine, nicotinic, pantothenic, and glutamic acid were essential for all strains. L. casei required additionally riboflavin and folic acid, and the Leuconostoc required thiamine. Pyridoxol and biotin acted as stimulants for some strains. Cobalamin, 4-amino benzoic acid, inositol, γ-aminobutyric acid, asparagine and lysine had no effect on the growth of the lactic acid bacteria tested. OA

10 H 1561
[Studies on the microflora of takju brewing.]
Lee, Z. S.; Rhee, T. W.
1558df **8** (3) 116-133 (1970) [73 ref. Ko, en] [Dept. of Biol., Coll. of Education, Seoul Nat. Univ., Korea]
A microflora survey was made of kokja (starter) and takju (Korean rice wine). The following microorganisms were identified in kokja: Mucor, Rhizopus, Aspergillus (moulds); Saccharomyces, Pichia, Candida, Torulopsis, Hansenula (yeasts); Micrococcus, Bacillus, Aerobacter, Pseudomonas (bacteria). In takju, the major organisms found were: Micrococcus, Bacillus subtilis, B. megatherium, Pseudomonas, Salmonella, Streptococcus, Escherichia, and sake yeasts. KoSFoST

10 J 1565
[Studies on the effect of furyl furamide (AF-2) on Korean kimchi.]
Chung, H. K.
1551ci **12**: 57-67 (1969) [28 ref. En, ko] [Dept. of Food Tech., Kon Kuk Univ., Seoul, Korea]
Preservation of kimchi (a spiced pickle) using furyl furamide (i) was studied. Microflora of kimchi was influenced even at a concn. of 10 ppm but it was impossible to check the acidification of kimchi in summer with 50 ppm (i). Bacillus spp. were sensitive to low concn. but lactic acid bacteria were resistant to a high concn. of (i). Permitted concn. of (i) in Korean kimchi was <10 ppm. About 25% of (i) was consumed in kimchi fermentation for 1 day at 23-25°C. KoSFoST

10 S 1251
[Lactobacilli and closely related microorganisms in meat and meat products. VII. Products of carbohydrate metabolism and their antagonism towards saprophytic and enterotoxic microorganisms.] Laktobazillen und eng verwandte Mikroorganismen in Fleisch und Fleischwaren. VII. Kohlenhydratstoffwechselprodukte und antagonistische Aktivitäten gegenüber saprophytären und enterotoxischen Mikroorganismen.
Reuter, G.
Fleischwirtschaft **51** (8) 1237-1242 & 1245 (1971) [28 ref. De, en, fr] [Inst. für Lebensmittelhygiene, Freie Univ., 1000 Berlin 33, Bitterstrasse 8-12, German Federal Republic]

Quantitative determination of major carbohydrate breakdown products produced by representative strains in liquid culture showed these to be lactic and acetic acids and CO_2 from heterofermentation. Thermobacteria and streptobacteria were strong acid formers producing 0.8-1.5% lactic acid, atypical streptobacteria and heterofermentation species were weaker, producing 0.3-0.8% lactic acid. Acetic acid comprised only 0.023-0.05% by homofermentative and 0.114-0.143% by heterofermentative strains; no aldehydes or diacetyl and only traces of pyruvic acid were found. The antagonistic effect of lactobacilli on other food microorganisms (enterococci, micrococci, bacilli, pseudomonads and enterobacteria) was tested by the agar cup method using centrifuged culture fluid, and by the suspension test comparing competitive growth. The activity of different lactobacilli varied directly with their lactic acid formation. Acetic acid was not present in sufficient concn. to exert inhibition. No H_2O_2 was found in any Lactobacillus culture to account for greater inhibition of some strains than was attributable to lactic acid formation. Lactic acid did not build up until the logarithmic growth phase and reached max. concn. in the stationary phase; consequently there could be an initial vigorous growth of their microorganisms, especially with high contamination. RM

10 S 1258
Effect of fermentation temperature on changes in meat properties and flavour of summer sausage.
Acton, J. C.; Williams, J. G.; Johnson, M. G.
Journal of Milk and Food Technology **35** (5) 264-268 (1972) [17 ref. En] [Dept. of Food Sci., Clemson Univ., South Carolina 29631, USA]

Changes in several parameters during summer sausage fermentation by Pediococcus cerevisiae at 22, 30, and 37°C were followed over a 72 hr period. A decrease in meat pH from 5.9 to 4.6 was significantly correlated with the increase of lactic acid. Significantly less acid was produced at 22°C than at 30 and 37°C. The meat water-holding capacity, as determined by extract release volumes, was significantly affected by time and temperature of fermentation. Lactic acid production was correlated with growth of the added starter culture but maximal amounts of lactic acid were not produced until approximately 24 hr after maximal cell populations were reached. Panel analysis of summer sausage fermented at 22 and 37°C showed that fermentation temperature within this range did not significantly affect product flavour. The importance of this latter finding to meat processors is discussed. AS

10 S 1410
[Laying down standards for bacterial counts in liver sausages.] Beitrag zur Frage der Aufstellung von Normkeimzahlen für Leberwürste.
Kabuczu, A.; Angersbach, H.; Hadlok, R.
Fleischwirtschaft **52** (4) 497-500 (1972) [13 ref. De, en, fr] [Inst. für Tierärztliche Nahrungsmittelkunde, 6300 Giessen, Frankfurter Strasse 92, German Federal Republic]

The bacterial contents of 100 samples of organoleptically perfect liver sausage (age 1-14 days) from 25 sales outlets were examined. Total aerobic counts (surface method) ranged from 0 to 22.3×10^6/g, with 32% of samples ≤10 000/g; 59% ≤ 000/g; 86% ≤100 000/g. Aerobic spore-formers predominated. 46% of samples contained Bacillus cereus, 50% lactobacilli, 14% micrococci, 6% yeasts, Gram negative organisms, 32% sulphite-reducing obligate anaerobes (clostridia, with 2-42 000/g Cl. perfringens in 13% of samples). No enterococci, coagulase-positive staphylococci or salmonellae were detected. The proportions of different types in all samples were: spore-forming aerobes 76.7%, lactobacilli 19.7%, micrococci 3.0%, others 0.6%. N relation was found between age of sausages and composition of the bacterial flora. The following standards are suggested: aerobes $\leq 10^5$/g; sulphite-reducing clostridia ≤20/g; no Gram negative organisms, faecal streptococci or coagulase-positive staphylococci in 0.01 g. [See also FSTA (1970) **2** 7S631.] RM

11 B 102
[Heat resistance of lactobacilli at different a_w values.] Hitzeresistenz von Laktobazillen bei unterschiedlichen a_w-Werten.
Vrchlabsky, J.; Leistner, L.
***Fleischwirtschaft* 51** (9) 1368-1370 (1971) [34 ref. De, en] [Bundesanstalt für Fleischforschung, Kulmbach, German Federal Republic]

The heat resistance of 3 Lactobacillus spp. (L. brevis, L. viridescens, L. plantarum) isolated from discolored pickled (salted) meat was investigated at different a_w (water activity) values. The a_w of the substrate used in the studies, trypticase soy broth, was adjusted from 0.995 to 0.985, 0.975, 0.950 and 0.940 by additions of NaCl, a salt mixture ($NaCl:KCl:Na_2SO_4$, 5:3:2), or sucrose. The substrate, inoculated with 10^6-10^7 cells/ml, was heated at 65°C for 15, 30 and 60 min and the heat resistance of the lactobacilli expressed in terms of the D_{65} value (time, in min, required to destroy 90% of the lactobacilli at 65°C). with decreasing a_w the heat resistance of the 3 spp. first increased and then decreased. With NaCl addition, max. resistance was observed at a_w 0.985 (1.4% NaCl) to 0.975 (3.4% NaCl); with salt addition max. resistance was at a_w 0.950. Results with added sucrose were variable. L. plantarum was more heat resistant than the other 2 spp. The lactobacilli were more heat resistant in the presence of NaCl than in the presence of the salt mixture or sucrose. This protective action of NaCl may have important implications for meat processing. RM

11 C 270
[Microbiological examinations of fully cooked meals.] Mikrobiologische Untersuchungen von Fertiggerichten.
Mohs, H. J.
***Gordian* 72** (6) 203-205 (1972) [4 ref. De, en]

The technology and microbiology (including test methods) of fully cooked meals are discussed. The following limits are suggested, to be used as directives only: total aerobes $<10^5$/g, coliforms $<10^2$/g, E. coli not demonstrable in 1 g, salmonellae not demonstrable in 30 g, spore forming aerobes $<10^4$/g, sulphite reducing spore forming organisms $<10^3$/g, coagulase positive staphylococci $<10^3$/g, faecal streptococci $<10^3$/g. Evaluation of hygienic quality of products should take account of both total and specific counts and the technology of the production method. RM

11 C 285
Interactions of food starter culture and food-borne pathogens: the antagonism between Streptococcus lactis and sporeforming microbes. [A review]
Hurst, A.
***Journal of Milk and Food Technology* 35** (7) 418-423 (1972) [102 ref. En] [Res. Lab. of the Food and Drug Directorate, Dept. of Nat. Health and Welfare, Ottawa, Ontario, Canada]

Lactic acid bacteria hinder development of sporeformers by production of acids, peroxides, and antibiotics. One of the best known of these antibiotics is nisin which is produced by Str. lactis and is a permitted food additive in many countries. This review traces the history of nisin, its effect in milk, cheese, processed cheese, and canned and other foods. Nisin primarily affects Gram-positive bacteria but some of these produce nisinase, an enzyme which inactivates it. The preservative effect of nisin in heat-treated foods is probably related to the retention of nisin on sporecoats Nisin affects outgrowth of spores but not spore germination. AS

11 H 1603
[Putrefactive lactic acid bacteria isolated from sake moromi mash in 1970.]
Momose, H.; Akiyama, H.
***Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 66** (12) 1195-1196 (1971) [5 ref. Ja,] [Res. Inst. Brewing, Tokyo, Japan]

From several moromi mash spoiled by bacterial infection, 6 lactic acid bacteria were isolated. According to the Bergey classification they were identified as Lactobacillus casei (2 strains), L. plantarum (1 strain), L. leichmannii (1 strain), Leuconostoc mesenteroides (1 strain), and thermophilic Streptococcus faecalis or Str. durans. YN

11 H 1696
Pediococcus cerevisiae in fermentation.
Engel, E. L. van
***Proceedings. American Society of Brewing Chemists* 1971**: 89-95 (1971) [23 ref. En] [Blitz-Weinhard Co., Portland, Oregon, USA]

A short forcing test in which wort bacteria are suppressed without inhibiting growth of Pediococcus cerevisiae and a modification of the 5-tube MPN procedure were used to study growth and control of P. cerevisiae in fermentation. Results showed that during fermentation the number of pediococci increased 2-3 fold, primarily in the yeast layer at the bottom of the fermenter after active fermentation had slowed or stopped. Standard yeast washing procedures were found to be effective in reducing and controlling growth of pediococci in fermentation. Significance of the findings in relation to the control procedures currently used in brewing is briefly discussed. PG

11 H 1725
[Putrefaction of sake. VI. Alcoholophilic nature of genuine hiochi bacteria.]
Momose, H.; Akiyama, H.; Noshiro, K.
***Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 66** (8) 799-804 (1971) [15 ref. Ja, en] [Res. Inst. of Brewing, Takinogawa, Kita-ku, Tokyo, Japan]

Growth of genuine hiochi (sake spoilage organisms) bacteria was stimulated by (i) acetone, (ii) 1,2-dimethoxyethane, (iii) ethyl acetate and (iv) ethyl alcohol. Washed cells of the bacteria took up more glucose in the presence of suitable concn. of (i), (iii) and (iv) and by treatment of the cells with 10^{-4} M ethylenediamine tetra acetate (EDTA). Hiochi-type lactobacilli were inhibited by (i), (iii), and (iv). Lactic acid dehydrogenase (LDH) activity was measured using 2,6-dichlorophenol indophenol as H acceptor. LDH activity of intact cells of genuine hiochi bacteria increased in the presence of a suitable concn. of (i), (iii) and (iv), while that of hiochi-type lactobacilli was inhibited. LDH activity of mechanically crushed cells of both types of organism was inhibited by the reagents. Intact cells of genuine hiochi bacteria treated with EDTA increased their LDH activity, while those of hiochi-type lactobacilli were not influenced. Growth stimulation of both organisms was assumed to be due to acceleration of nutrient uptake by the cells. YN

11 M 1281
Sour dough bread.
Everson, C. W. (Merck & Co. Inc.)
United States Patent 3 681 083 (1972) [En]

Sour dough bread is produced by including in the dough ingredients the microorganism Pediococcus cerevisiae or Pediococcus acidilactici to produce lactic acid in the dough. The dough is permitted to rise for from ½ to 4h and then is baked. IFT

11 S 1551
[Experimental ripening of dry sausages using lactobacilli and micrococci starter cultures.]
Versuche zur Rohwurstreifung mit Laktobazillen- und Mikrokokken-Starterkulturen.
Reuter, G.
***Fleischwirtschaft* 52** (4) 465-468 & 471-473 (1972) [34 ref. De, en, fr] [Inst. für Lebensmittelhygiene, 1000 Berlin 33 (Dahlem), Bitterstrasse 8-12, German Federal Republic]

4 salami-ripening trials were carried out with lactobacilli and micrococci starter cultures. Nitrate was used in 1 trial and nitrite in the others. In the first 2, effects of glucono-delta-lactone (GDL) were studied. Addition of micrococci produced a visible increase in initial micrococci values but no noticeable increase in numbers was observed. When nitrate was used, micrococci balanced the colour fault resulting from use of GDL. 0.7% GDL improved colour, colour retention and consistency in salami containing nitrite but did not permit full development of aroma. Yeast content increased when GDL was added, whilst contents of lactobacilli, enterococci and to some extent micrococci were reduced. Added lactobacilli, as compared with lactobacilli already present, achieved dominance in only one case. The strain involved, L. farciminis nov. spec., caused undesirable flavour changes and is unsuitable as a starter. L. plantarum and strains A2 and C3 of atypical lactobacilli normally dominant in dry sausage improved aroma. Although these 3 strains only increased by 0.5-1.5 powers of ten, they improved aroma, and the tallowy flavour found in controls was not evident. These favourable effects were not affected by ripening with or without smoking or by differences in initial material, e.g. fresh or frozen meat. AS

12 H 1797
[Spontaneous malolactic fermentation in wine.]
Peynaud, E.; Lafon-Lafourcade, S.
***Industries Alimentaires et Agricoles* 89** (4) 398-402 (1972) [7 ref. Fr, de, en] [Sta. Agronomique et Oenologique, Bordeaux, France]

An attempt was made to develop a test for malolactic fermentability; i.e. the ability of a wine to facilitate the enzymic conversion of malic acid. 2 series of experiments were carried out, one involving 10 wines and 7 lactic acid strains, the other 5 wines and 6 strains. The strains used included Lactobacillus casei R_6, Streptobacterium sp. 12, L. brewis C12, several L. hilgardii strains, Leuconostoc gracile Cf 34 and Pediococcus vini Ja 2. The amount of malic acid converted in a given time by a set amount of the bacteria is determined. For this purpose, the wines are reduced to 10° alcohol by dilution, malic acid being added to those wines which had already undergone malolactic fermentation. To 10 ml wine are added 10, 20, or 50 mg bacteria (equiv. to 1, 2 or 5 g/l.), and the malic acid content is determined after 3, 24 and 48 h. There was a wide variation in the results. Conversion of the malic acid was rapid in some cases, but presence of inhibitors of malolactic fermentation was observed in others. Some of the bacteria used were better adapted for certain of the wines than others; this is thought to account for some of the practical difficulties encountered in techniques for inducing malolactic fermentation. LA

12 H 1806
[Vegetable or fruit juice containing lactic acid.]
Milchsäurehaltige Gemüse oder Fruchtsäfte.
Eden Waren GmbH
German Federal Republic Patent Application 2 001 874 (1972) [De]

Juice or mash (e.g. of bananas, carrots or beetroot is pasteurized for 20-40 sec. at ~70-80°C to destroy all lactic acid forming bacteria. The sterile product is then cooled to ~40°C by heat exchange and inoculated with lactic acid fermenting bacteria, e.g. mixtures of Lactobacillus salivarius, L. casei, Streptococcus lactis and Str. cremoris, which produce predominantly L(+)-lactic acid. The product is allowed to ferment for 12-20 h at an initial temp. of ~38°C, which is gradually reduced by 1-3°C. The final pH is 3.7-3.9, or fermentation may be interrupted at pH 4.1-4.5 to obtain products of different flavour. Fermentation is followed by pasteurization; masher are pressed to obtain the juice. For further flavour variation, bacteria may be used which produce traces of fermentation by-products, e.g. CO_2, formic or acetic acid, lower alcohols, ketones, esters, etc. Product quality is improved, and the lactic acid content is restricted to that which is of nutritive value. W&Co

12 H 1906
[Sterilizing doses of ulstraviolet rays and ultrasonic waves used to treat the basic microflora of wine.]
Avakyan, B. P.
***Biologicheskii Zhurnal Armenii* 24** (1) 90-94 (1971) [12 ref. Ru] [Inst. Vinogradarstva, Vinodeliya i Plodovodstva MSCH ArmSSR, USSR]

Tests were made of the effect of the title treatments on Saccharomyces vini, Hanseniaspora apiculata, Torulopsis utilis, Candida mycoderma, Lactobacterium plantarum and Acetobacter aceti isolated from local wines. Differential tests of ultraviolet rays and ultrasonic waves showed that different doses of radiation or ultrasound produced a different bactericidal effect. High doses of X-rays led to inactivation of the microorganisms investigated. The biological effect of inactivation of microorganisms and changes in chemical composition and sensory properties were also investigated. STI

12 J 1964
[Biogenic amines in sauerkraut.] Biogene Amine in Sauerkraut.
Mayer, K.; Pause, G.
***Lebensmittel-Wissenschaft und Technologie* 5** (3) 108-109 (1972) [6 ref. De] [Eidg. Forschungsanstalt für Obst-, Wein- und Gartenbau, CH-8820 Wädenswil, Switzerland]

Of 2 sauerkraut samples studied, the one containing considerably higher levels of histamine, tyramine, cadaverine and putrescine was shown by microscopic investigation also to have a higher population of cocci. By analogy with a previous study on the occurrence of histamine in wine, the authors argue that the amines are produced during acid synthesis by lactic acid bacteria. DSW

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See also back page

1 P 8
[Quantitative determination of bitter peptides in culture media of lactic streptococci.]
Zvyagintsev, V. I.; Medvedeva, Z. P.; Buzov, I. P.
Molochnaya Promyshlennost' **33** (7) 17-18 (1972) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Centrifuged milk cultures of Streptococcus cremoris HP and Str. lactis 406_3 ('bitter' strains), Str. cremoris E_8 and Str. lactis 497_2 ('non-bitter' strains) and a bitter-producing 'mammococcus' [Streptococcus liquefaciens] used as control were prepared as described in FSTA (1972) **4** 4P449 and deproteinized using CCl_3COOH or acetone, then recentrifuged; the supernatant liquid was concentrated at 70°C, the oily residue was washed with diethyl ether, and the insoluble part was extracted with acetone; the acetone extract was chromatographed on paper using butanol/acetic acid/water (4:1:5) as developer. 3 peptide zones were detected with ninhydrin, the middle one (R_f 0.85-0.90) having the most pronounced bitter taste; some bitterness was also shown by the R_f 1.0 zone. The middle zone could be detected in cultures of non-bitter strains only by using much larger quantities of extract. Quantitative determination was by photometry of zone eluates (80% ethanol) using a reference curve of a chosen amino acid. [See also FSTA (1972) **4** 9P1371.] SKK

1 P 11
[The preparation of very active lactic cultures.]
Sozzi, T.
Lait **52** (517) 454-465 (1972) [10 ref. Fr, en] [Dept. Recherche et Developpement, Soc. d'Assistance Technique pour Produits Nestle SA, Lausanne, Switzerland]

Measurement of acidifying ability (change in pH and acidity produced by 2 ml of culture in 10 ml milk in 3 or 6 h) proved more valuable than pH, acidity (°SH) or bacterial count for assessing the activity of 4 strains of Streptococcus lactis, 3 of Str. thermophilus, 2 each of Str. diacetilactis, Str. cremoris and Lactobacillus lactis and 1 of L. helveticus. Cultures of these organisms at 30°C (mesophilic strains) or 40°C (thermophilic strains) in 10% reconstituted dried skim-milk containing 0.1% yeast extract showed max. activity at the point of coagulation, with the exception of Lactobacillus spp. which showed max. activity 2-4 h after coagulation. The traditional method of starter preparation does not permit production of starter cultures with increased activity since the incubation time is too long; arresting the cultures at the point of coagulation is therefore considered to be justified. CDP

1 P 53
Growth of Leuconostoc citrovorum in skim-milk fortified with cobalt, manganese, and iron compounds.
Goel, M. C.; Marth, E. H.
Journal of Milk and Food Technology **35** (5) 269-275 (1972) [24 ref. En] [Dept. of Food Sci., Univ. of Wisconsin, Madison, 53706, USA]

$CoCl_2$ (0.001-0.1%), $MnCl_2$ (0.00001-0.001%), ferric citrate (0.0001-0.1%) and $FeSO_4$ (0.001-0.1%) were tested for their effects on growth and chain formation of 4 strains of Leuc. citrovorum in skim-milk at 22 and 30°C. Only $CoCl_2$ inhibited growth, 0.1% completely inhibiting and 0.01% markedly reducing growth of all strains; $MnCl_2$ generally enhanced growth, particularly at 22°C where the degree of stimulation was directly proportional to the amount of $MnCl_2$ present. $CoCl_2$ had little effect on chain length; $MnCl_2$ significantly increased chain length ($P<0.05$), this being particularly evident with strain Da3 at 30°C at all $MnCl_2$ concn. $FeSO_4$ and the higher concn. of ferric citrate also caused formation of longer chains of Leuc. citrovorum. Ferric citrate was essentially without effect on growth of the 2 strains (9 and 14) tested, whereas $FeSO_4$ was stimulatory, particularly at 22°C, to growth of the only strain (14) tested. CDP

1 P 55
[Thermal destruction of lactic acid bacteria and contaminants in skim milk and milk fat containing media.] Thermische Abtötung von Milchsäurebakterien und Kontaminanten in Magermilch und milchfetthaltigen Medien.
Puhan, Z.; Flüeler, O.
1072bd **5** (4) 144-146 (1972) [5 ref. De] [Milchtech. Inst. der Eidgenössischen Tech. Hochschule, Eisgasse 8, 8004 Zurich, Switzerland]

Thermal destruction of Escherichia coli, Staphylococcus aureus, Mucor pusillus, Torula sp. and the organisms of a mesophilic cream starter was complete at 64°C for 30 min and at ≥72°C for 20 sec in skim-milk, 35% cream, butter and butterfat. Streptococcus thermophilus and the spores of Clostridium butyricum and Cl. sporogenes showed progressively less resistance to destruction as the fat content of the medium increased; for Str. thermophilus, survival at 72°C for 20 sec was nil in butterfat, 0.03% in butter, 9.7% in 35% cream and 16.7% in skim-milk; survival of Cl. sporogenes spores showed dependence on fat content of the medium at all the heat treatments applied, and only 2 of 6 samples survived heat treatment at 95°C for 20 sec in butterfat. Survival of Cl. butyricum spores was only affected by fat content of the medium when heat-treated at 95°C. GTP

1 P 59
[Research on the technological and bacteriological qualities of rennet extracts manufactured in Turkey.]
Özer, I.
***Türk Veteriner Hekimleri Dernegi Dergisi* 39** (8) 17-24 (1969) [17 ref. Tr, en] [Ankara Univ. Vet. Fak., Turkey]

60 samples of rennet extract produced in Turkey had an average pH of 4.93, NaCl content of 14.71% and [coagulating] strength of 1/3800. Total plate count averaged 510/ml, the predominant microflora being lactic acid bacteria. Aerobic and anaerobic sporeformers averaged 91 and 69/ml respectively. No coliforms, yeasts or moulds were found. The manufacturing methods used were considered to be rather primitive and in need of improvement. [From Key Turk. Sci., Vet. Anim. Sci. (1969) **4** (1/2) 70V069] CDP

1 P 61
The selection and maintenance of starters for non-Cheddar cheese varieties.
Legg, W. M.
***New Zealand Journal of Dairy Science and Technology* 7** (1) 2-3 (1972) [En] [Co-operative Rennet Co. Ltd., Eltham, New Zealand]

Single strain starters were maintained by weekly subculture in 10% (w/v) reconstituted inhibitor free dried skim-milk. The selection of individual strains was based on the pH of one-day-old cheeses and on flavour of cheeses at maturity. Pure cultures of Lactobacillus lactis, L. helveticus, Streptococcus thermophilus and Propionibacterium shermanii were used to make Gruyere, Romano and Parmesan types. Blue Vein, Feta, Danbo, Havarti and Gouda cheeses were made with mesophilic Str. cremoris AM_2 as starter. Addition of 0.2% Leuconostoc citrovorum to the cheesemilk increased the rate of flavour development. The regular acid production achieved with single strain starters resulted in the consistent manufacture of high grade cheese. BAL

1 P 62
Techniques and equipment improve cheesemaking.
Anon. (Rasmussen, H. L.; Olson, N. F.; Nilson, K. M.; Hales, M. W.)
***Food Engineering* 44** (10) 137, 140 (1972) [En]

Some topics discussed at an Italian Cheese Seminar in Madison, Wisconsin are reported under the headings: Testing milk quality, by H. [L.] Rasmussen; Phage-resistant Str. thermophilus starters, by H. L. Rasmussen; Fortified milk, by N. F. Olson; Underwater Cheddaring, by K. M. Nilson; New style cheese vat, by M. W. Hales. JN

1 P 72
Microbiological and chemical studies on zabady.
El-Sadek, M. G.; Naguib, Kh.; Negm, A.
***Milchwissenschaft* 27** (9) 570-572 (1972) [29 ref. En, de] [Dept. of Food Sci., Fac. of Agric., Ein-Shams Univ., Cairo, United Arab Republic]

50 random samples of zabady from Cairo market had an average titratable acidity of 1.01% (0.6-1.54%) and pH of 3.7 (3-4.4). Average composition was 3.62% (1.05-6.8%) fat, 4.17% (3.11-5.6%) total protein, 14.32% (10.64-18.57%) TS, 2.92% (1.2-4.8%) lactose and 0.65% (0.39-1.37%) ash. Total microbial counts on tryptone/yeast extract/glucose/lactose agar averaged 1182 million/ml, the predominant species being streptococci (mainly Streptoccoccus thermophilus) followed by micrococci and microbacteria. Lactobacillus counts on Rogosa medium averaged 696 million/ml with Lactobacillus bulgaricus predominating. Yeast + mould counts on malt extract agar averaged 688 000/ml and were mainly Candida spp.; yeasts were detected in 84% of samples. Coliform counts by the MPN technique ranged from 0 to 2.4 million/ml with an average of 152 000/ml, these organisms being detected in 58% of samples. CDP

1 P 77
Effect of suspending media on the viability of freeze-dried culture of Streptococcus lactis.
Sinha, R. N.; Nambudripad, V. K. N.; Dudani, A. T.; Laxminarayana, H.
***Journal of Food Science and Technology, India* 9** (2) 85-89 (1972) [16 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

Of 12 media tested for their suitability as suspending media for freeze-drying Str. lactis C2, sodium glutamate gave the best results, followed by fortified skim-milk (prepared by incorporating 0.5% each of ascorbic acid, thiourea and NH_4Cl in 10% reconstituted skim-milk). In both these media there was >80% survival after freeze-drying under either vacuum or air, and cells remained viable for >1 yr at 30°C. Survival was lowest in glass-distilled water at 10% reconstituted skim-milk suspending media. A possible relationship between residual moisture in the freeze-dried suspension and survival of the cells is discussed. CDP

1 P 81
Dairy Science Section 3rd Annual Conference. Abstracts of papers.
New Zealand, New Zealand Society of Dairy Science and Technology
New Zealand Journal of Dairy Science and Technology **7** (3) 103-108 (1972) [En] [PO Box 459, Hamilton, New Zealand]

The following papers were presented at the conference held in Palmerston North on 3-4 July 1972: Effects of heat on whey proteins, by D. F. Newstead (p. 103); Enzymes in the dairy industry - present and future, by K. P. Marshall (pp. 103-104); Partial concentration of whey by reverse osmosis, by A. D. Wilson (p. 104); Some implications of the differing responses of lactic streptococci to increases in growth temperature, by R. J. Lowrie (p. 104); Rennet substitutes, by L. K. Creamer (p. 105); Some properties of lactic streptococci used as casein starters, by T. D. Thomas (p. 105); Rheology of casein systems, by C. Towler (pp. 105-106); Flow characteristics of milk powders, by C. G. Bloore (p. 106); The response of lactic streptococci to aeration, by G. F. Hoglund (pp. 106-107); Enzyme concentration by reverse osmosis, by N. H. Clarke (p. 107); Products other than acid produced by lactic streptococci, by A. R. Keen (p. 107); Assessment of errors in the estimation of the whey protein nitrogen index of skim-milk powder and some implications, by D. F. Newstead (p. 107); and a comparison of starters for cultured dairy products, by L. E. Pearce (p. 108). [See FSTA (1972) **4** 3P308 for report of previous meeting.] CDP

1 P 82
[New yoghurt culture of increased resistance to inhibitory agents.]
Teply, M.; Hylmar, B.
Prumysl Potravin **23** (9) 264-266 (1972) [15 ref. Cs, ru, en, de] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Yoghurt has been successfully manufactured using starter cultures in which Streptococcus thermophilus has been replaced by Pediococcus acidilactici, which is less sensitive to phenol and antibiotics. CDP

2 P 152
Cheese flavors.
Kasik, R. L.; Luksas, A. J. (Beatrice Foods Co.)
United States Patent 3 667 968 (1972) [En]

Cheese flavouring composition are produced by culturing mixtures of certain Bacillus and Streptococcus spp. in an aqueous protein- and carbohydrate-containing medium. Certain combinations were found to be particularly suitable for reproducing the flavour of certain cheese varieties; e.g. a combination of B, megatherium with organisms of the Str. lactis-diacetilactis group produced a superior Cheddar cheese flavour. For the blue cheese varieties, the above mixtures are fermented further with Penicillium roquefortii before being spray-dried. ESM

2 P 221
[Resistance of Lactobacillus bulgaricus and Streptococcus thermophilus in yoghurt starters at different stages of development to very low temp. (liquid N_2 freezing).]
Girginov, T. A.; Kiskinova, D. V.; Girginova, T. T.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (3) 23-31 (1970, publ. 1972) [15 ref. Bg, ru, en] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]

Sterile skim-milk was inoculated with 2% active L. bulgaricus/Str. thermophilus yoghurt starter and incubated at 45°C. Samples were taken when titratable acidity reached 26°, 32°, 40° or 75°T and sealed in ampoules; a further sample was taken after coagulation, centrifugation and resuspension in sterile milk (concentrated starter) and sealed in ampoules. A coagulated sample was prepared by sealing a portion of the inoculated milk in ampoules and incubating at 45°C until it coagulated, then refrigerating overnight. The ampoules were sealed at -196°C in liquid N_2 and stored at -20°C for 2 days. Working cultures were prepared from the frozen starters by incubating with 100 ml sterile milk at 45°C until 2 h after coagulation, then 2% inocula were added to 500 ml sterilzed homogenized milk and held at 45°C. Yoghurt produced from these frozen starters had a normal microflora, a pleasant lactic acid taste, pronounced aroma and a well thickened coagulum. Best results were obtained with the starter frozen at 40°T acidity, followed by that at 75°C, the concentrated and coagulated starters; the starter frozen at 26°T acidity gave the poorest results. SKK

2 P 223
[Effects of some factors on preservation of activity by yoghurt starters in prolonged frozen storage after liquid N_2 freezing.]
Girginov, T. A.; Kiskinova, D. V.; Girginova, T. T.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (3) 33-41 (1970, publ. 1972) [5 ref. Bg, ru, en]

Samples of frozen yoghurt starter, prepared and tested as described in the preceding abstr. were held at -10° and -20°C for from 10 days to 6 months. All samples stored for ≤1 month showed good activity, except the 26°T sample stored for 1 month. On longer storage, 40°T samples gave the best results and 75°T samples also did well. The 26°T samples stored for ≥1 month showed good Streptococcus thermophilus growth, but Lactobacillus bulgaricus grew poorly and yoghurt produced tasted sweetish and insipid. SKK

2 P 225
[Production of acidophilus drink.]
Nippon Soda Co. Ltd.; Nikken Chemicals Co. Ltd.
Japanese Patent 37 555/72 (1972) [Ja]
Method involves fermentation of a maltitol composition with Lactobacillus acidophilus at 35-40°C for ≤2 days. IFT

2 P 247
[Metabolic activities of dairy lactic acid bacteria in the presence of preservatives.]
Nakae, T.; Kataoka, K.; Fujikawa, K.
Journal of the Food Hygienic Society of Japan [Shokuhin Eiseigaku Zasshi] **12** (2) 105-110 (1971) [13 ref. Ja, en] [Fac. of Agric., Univ. Tsushima, Okayama-shi]
The inhibitory effects of sodium dehydroacetate (DHA-Na) and sodium sorbate (SA-Na), added at 0.02-0.10% to skim-milk, on acid production, proteolysis and aroma production by Streptococcus lactis, Lactobacillus bulgaricus, L. acidophilus and 2 Lactobacillus strains from commercial fermented milk products, were investigated. Acid production, particularly of L. bulgaricus incubated at 37°C for 24 or 48 h in skim-milk media, was markedly inhibited by 0.10% DHA-Na. Similar inhibition occurred with 0.02-0.10% SA-Na, especially in the case of Str. lactis. The presence of 0.02% of either preservative had little effect on proteolysis, but 0.08-0.10% retarded proteolysis in cultures incubated for 2 days. Aroma (diacetyl and acetoin) production by Str. lactis and some of the lactobacilli incubated for 2 and 4 days, was inhibited by some 0.04% DHA-Na. TM

3 B 29
[Studies on lactose-fermenting yeasts. VI. The investigations of the productions of ethanol fermented milk beverages by the mixed cultures with lactose-fermenting yeasts and lactic acid bacteria.]
Nakanishi, T.; Arai, I.
Japanese Journal of Dairy Science [Rakuno Kagaku no Kenkyu] **21** (3) A63-A69 (1972) [8 ref. Ja, en]
Mixed culture of lactose-fermenting yeasts (Candida pseudotropicalis A60 or Torulopsis spaerica J29) with lactic acid bacteria (Streptococcus lactis 527, Str. cremoris H61, Str. thermophilus 510, Lactobacillus bulgaricus B-1, L. acidophilus L-54 or L. casei L-14) at 30°C for 5-10 days in recombined skim-milk or whey showed that lactic acid fermentation by the bacteria occurred first and was followed by ethanolic fermentation by the yeasts. The yeast fermentation appeared to improve the odour and taste of lactic acid fermented beverages such as yoghurt. New types of beverages were produced using mixed cultures of the yeasts with L. bulgaricus or L. acidophilus, sugar being added at the end of ethanolic fermentation, or using mixed cultures of the yeasts with Str. lactis or Str. cremoris. [From En summ.] CDP

3 P 255
[Resistance of Lactobacillus bulgaricus to high temperatures.]
Girginov, T. A.; Kishinova, D.; Girginova, T. T.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (3) 83-90 (1970, publ. 1972) [5 ref. Bg, ru, en] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]
24-h cultures of 3 strains of L. bulgaricus with weak, medium and strong milk coagulating capacities were added at 2% to physiological saline, skim-milk or whole milk; after heating to 76°C for up to 60 min, to 80°C for up to 30 min, or to 85°C for up to 35 min, the samples were cooled and those in physiological saline were added at 2% to sterile skim-milk. All samples were then incubated at 37°C or 45°C and coagulation time and max. acidity were determined and morphology of L. bulgaricus assessed. Samples from all test tubes were inoculated into skim-milk for activity assessment. All 3 strains withstood exposure to 76 or 80°C for all time periods tested, and exposure to 85°C for 15 min. The suspension medium had little effect on heat resistance. SKK

3 P 261
[Quantitative and qualitative aspects of milk contamination via the milking machine.]
Quantitative and qualitative Aspekte der durch Melkaggregate verursachten Kontamination der Milch.
Geiges, O.
Schweizerische Milchwirtschaftliche Forschung **1**, 22-28 (1972) [26 ref. De, en, fr] [Milchtech. Inst. der ETH, Zürich, Switzerland]
A device for rinsing clusters for bacteriological tests is described and diagrammatically illustrated; it incorporates an artificial under and a pulsator and uses 1500 ml homogenized whole milk sterilized at 100°C on 3 consecutive days as the rinsing fluid. 20 clusters in operation in 3 cheese co-operatives in Thurgau canton were randomly selected for examination. Total viable counts ranged from 50 to 4.8×10^6/ml. Coliforms, thermoduric microorganisms and pathogenic staphylococci were present in only very small numbers. The following were the most commonly isolated microorganisms (%): Staphylococcus (Baird-Parker group 5), 21.3; Staphylococcus (group 3), 12.6; Streptococcus faecalis, 11.8; Microbacterium lacticum, 11.4; Micrococcus (Baird-Parker group 7), 6.3; Micrococcus (group 5), 6.0; and Str. dysgalactiae, 3.7. SKK

3 P 282
[Method for preventing bitter taste in cheese.]
Zvyagintsev, V. I.; Gudkov, A. V.; Medvedeva, Z. P.; Novogorodova, N. S.; Buzov, I. P.
(Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 350 823 (1972) [Ru]

Bitter taste in cheese is prevented by adding to the inoculum strains of lactic acid bacteria capable of breaking down bitter products formed during splitting of casein. The strains are selected by organoleptic evaluation of culture fluid containing bitter polypeptides, after incubation with the test strain, preferably for 4 days at 26°C. W&Co

3 P 285
[The importance of thermophilic lactic acid bacteria for fermentation processes in hard cheese.] Die Bedeutung der thermophilen Milchsäurebakterien für die gärungstechnischen Vorgänge in der Hartkäserei.
Steffen, C.
Deutsche Molkerei-Zeitung **93** (41) 1806-1810 (1972) [De]

The role of thermophilic lactic acid bacteria in the fermentation accompanying production of Emmental cheese is discussed and the influence of certain organisms investigated. During manufacture of Emmental cheese using Streptococcus thermophilus/Lactobacillus helveticus/. lactis starter, lactic acid production by Str. thermophilus (an organism characterized by fairly slow growth and max. activity at pH 6.0) was rapid initially but ceased at about 0.65%, a content insufficient for subsequent formation of adequate amounts of propionic acid and CO_2. Acid production by L. helveticus or L. lactis (organisms which multiply rapidly and have their max. activity at pH 5.2) was slow at first but rapid later, attaining the satisfactory level of 0.9-1.0% in 140 h. The appreciable proteolytic activity possessed by these organisms contributes to cheese flavour. The mixed Streptococcus/Lactobacillus cultures normally used combine this feature with continuous and adequate production of lactic acid. GTP

3 P 289
[Growth of Streptococcus faecalis and Str. faecium/Str. durans during manufacture and ripening of 'Trakiya' cheese.]
Girginov, T. A.; Choroleeva, M.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (3) 57-64 (1970, publ. 1972) [10 ref. Bg, ru, en] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]

'Trakiya' hard cheeses were made by the customary procedures from 600-l. batches of cows' milk pasteurized at 63°C for 30 min using (i) 2% of 'Trakiya' starter (3 parts butter starter + 1 part yoghurt starter, control cheese), (ii) 1% 'Trakiya' starter + 1% Str. faecium/Str. durans, (iii) 1% butter starter + 1% Str. faecium/Str. durans and (iv) 1% yoghurt starter + 1% Str. faecalis; total lactic acid bacteria and enterococci counts were carried out at the different stages of preparation and of ripening for 90 days. Enterococci counts in (i) and in (ii)-(iv) respectively were ('000/g): milk after coagulation 52 and 1640-1800; 5-day old cheese (highest values), 3500 and 520 000-15 000 000; and 90-day old cheese, 400 and 1270-1800. Corresponding values for lactic acid bacteria were: 1600 and 5240-6000; 1 120 000 and 1 360 000-1 700 000; and 51 000 and 200 000-440 000. Growth of Str. lactis, Str. cremoris, Str. thermophilus, Str. paracitrovorus and Str. diacetilactis and of Lactobacillus bulgaricus during cheese production was stimulated by the enterococci. SKK

3 P 308
[Method for enriching dairy products.]
Samezima, H.; Furukawa, H.; Deguchi, T.
Japanese Patent 3 189/70 (1970) [Ja]

Amino sugars, obtained in reaction of amino acids with reducing sugars, are used for enriching whole milk or modifying dried milk. In the enriched products the growth of lactic acid bacteria (e.g. Lactobacillus bifidus var. pennsylvanicus and L. bulgaricus) is enhanced and the production of lactic acid stimulated. FL

3 P 315
[New ways of using cultures in dairy plants.] Neue Wege der Kulturenanwendung im Molkereibetrieb.
Johannsen, G. B.
Deutsche Molkerei-Zeitung **93** (30) 1196-1201 (1972) [De] [Lab. 'Wiesby', Niebüll, Federal Republic of Germany]

Properties of lactic streptococci and lactobacilli are reviewed with particular reference to Str. cremoris, Str. lactis, Str. thermophilus and Leuconostoc citrovorum, as well as to conc. frozen 'Fermovac' and conc. freeze-dried 'Visbyvac' cultures manufactured in the 'Wiesby' laboratory for dairy use. [See also FSTA (1972) **4** 7P1076.] SKK

3 P 326

[Experimental production of Emmental cheese from immune milk and from milk with added blood serum.] Versuche zur Herstellung von Emmentalerkäse aus Immunmilch und aus Milch mit Blutserum-Zusatz.

Uusi-Rauva, E.; Rissanen, M.; Antila, M.

Milchwissenschaft **27** (9) 551-556 (1972) [8 ref. De, en] [Inst. für Milchwirtschaft, Helsinki Univ., Finland]

Coagulation experiments were carried out with bulk milk in the presence or absence of blood plasma from cows which had been immunized with Micrococcus freudenreichii ATCC 8459 or M. caseolyticus ATCC 13548. Plasma inhibited coagulation, but this effect could be eliminated by addition of $CaCl_2$. Growth of Streptococcus thermophilus, Lactobacillus lactis and L. helveticus starter organisms was inhibited only very slightly if at all by immune plasma. Emmental-type cheeses were made from milk ± immune blood plasma to which M. freudenreichii or M. caseolyticus had been added. Cheeses made without immune blood plasma were blown and tasted bitter, while cheeses with plasma were of near normal quality. SKK

3 P 353

[Microbiological and chemical study of Grana Padano cheese produced without the addition of formaldehyde.]

Caserio, G.; Bianchi, A.; Beretta, G.; Meneghetti, G.; Cataldo, G.; Abbondanza, S.; Giolitti, G.; Delforno, G.

Industria del Latte **8** (1) 3-40 (1972) [85 ref. It, en] [Istituto di Ispezione degli Alimenti di Origine Animale, Univ. di Milano, Italy]

After a review of the literature on Grana cheese, details are given of the manufacture of 14 cheeses from one batch of 6871 l. milk without the addition of formaldehyde. Results are tabulated of detailed microbiological and chemical analyses of the cheeses at various stages of manufacture and at intervals during 13 months ripening. Total mesophilic count (48 h at 30°C) increased to 77.5×10^6/g at the end of salting, decreasing to 3.25×10^6 at 12 months; other max. counts/g included 24×10^6 thermophilic lactobacilli in curd, 4×10^6 mesophilic streptococci at the beginning of salting, 65×10^6 mesophilic lactobacilli at 2 months, 2×10^5 micrococci, 2.2×10^5 staphylococci, 1.5×10^5 proteolytic organisms and 1.1×10^5 lipolytic organisms at 6 months, and 4×10^4 yeasts and moulds/g at 11 months. Some of these results were influenced by the slow penetration of salt into the centre of the cheese throughout the 12 months. The cheese lost an average of 13.84% wt. in the 13 months after pressing. Proteolysis continued throughout the 13 months, until 26.66% of the N was soluble; values are given for free and total individual amino acids. JMD

3 P 379

[Selection ofstrains in the formulation of strains in the formulation of starters.]

Klimovskii, I. I.; Zvyagintsev, V. I.; Gudkov, A. V.; Medvedeva, Z. P.

Molochnaya Promyshlennost' No. 9, 11-13 (1972) [7 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi, Promyshlennosti, Uglich, USSR]

100 Streptococcus lactis and Str. cremoris strains from the starter collection of the All-Union Butter and Cheese Industry Research Institute were tested for bitterness producing capacity. None of the strains tested showed bitterness by organoleptic assessment after culturing in milk for 6 h at 30°C and holding at room temp. for 1 h and under refrigeration overnight. Many strains showed bitterness using the rennet method described previously [FSTA (1971) **3** 11P1896], with the bitter principle formed being assessed organoleptically or by Biogel fractionation [Klimovskii et al., Moloch. Prom (1969) **30** (6) 10-14], and bitter peptides being determined directly by a paper chromatographic method based on Tokita's procedure [Z. Lebensmittelunters. u.-Forsch. (1968) **137** (6) 370-373]. Bitterness was in general proportional to the bitter peptide contents expressed as mg % alanine [see FSTA (1972) **4** 11P1691]. Strains of increasing bitterness had the following alanine contents: Str. lactis 497_2 (non-bitter), 0.633; Str. cremoris E_8 (non-bitter), 0.712; Str. lactis 976_{24}, 1.83; Str. lactis 4867, 2.79; Str. lactis 406_3, 4.15; and Str. lactis 406_3 + Str. paracitrovorus II_3, 3.86. SKK

3 P 381

[Effect of major components of the microflora of tvorog and smetana starters on multiplication of Escherichia coli.]

Sukhova, T. S.

Molochnaya Promyshlennost' No. 9, 8-11 (1972) [Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

In a comparative examination of 7 tvorog and smetana starters, 3 with predominance of Streptococcus cremoris and 1 composed of Str. lactis strains only, showed stronger inhibition of E. coli than did the remaining 3 starters in which Str. lactis predominated or was present exclusively. In joint culturing in milk with E. coli, only 2 of the starters with predominance of Str. cremoris and none of the starters with predominance of or only Str. lactis exerted an inhibitory effect; inhibition was more marked with low initial E. coli counts. It is suggested that E. coli should not be present in ≤0.3 ml in pasteurized milk used for tvorog manufacture. [See FSTA (1972) **4** 5P705 & 3P320.] SKK

3 P 383
[Proteolytic activity of thermophilic lactic acid bacteria, used in hard-cheese manufacture.]
Shchedushnov, E. V.; Dyachenko, P. F.
Molochnaya Promyshlennost' No. 9, 13-17 (1972) [5 ref. Ru] [Moskovskii Tekh. Inst. Myasnoi i Molochnoi Promyshlennosti, Moscow, USSR]

1 strain of Lactobacillus helveticus, 3 of L. bulgaricus, 3 of L. acidophilus, 2 of L. plantarum, 2 of L. casei and 3 of Streptococcus thermophilus were cultured at optimum growth temp. for 7 days in skim-milk medium + marble grits, [FSTA (1970) **2** 11P1481] and their proteolytic activities were assessed from determination of concn. of amino N, soluble N compounds, non-protein N and free amino acids in the culture medium. Overall, L. helveticus and L. casei had the highest and Str. thermophilus the lowest activity. The activity of L. plantarum was the lowest among the lactobacilli. SKK

3 P 384
[Activity of lactic streptococci stored frozen.]
Zalicka, B.
Roczniki Technologii i Chemii Zywnosci **22** (2) 161-171 (1972) [20 ref. Pl, en, fr] [Katedra Mikrobiologii Tech., Politech., Lodz, Poland]

Streptococcus lactis 112 and 161, Str. diacetilactis 239, 258 and 259, and Str. cremoris 328 (all from the Olsztyn Pure Culture Production Laboratory) were inoculated at 5% into yeast autolysate/peptone/lactose/citric acid medium and incubated at 30°C. The cells were harvested after 8-9 h (early stationary phase) by centrifugation, and were washed with phosphate buffer, then resuspended in sterile skim-milk (1:1) at concn. of 10^1-10^{11} cells/g; 1-, 5-, 10-, 20- and 100-g portions were hermetically sealed in dark green glass bottles and stored for up to 80 days at -20° -38°C. -38°. Irrespective of duration or temp. or storage, the reactivated suspensions showed high viability (80-100%), and normal acidifying capacity after incubation for 12-16 h. Their activity in the methylene blue reduction test was higher than that of cells cultured in milk. Some decrease of reducing capacity in comparison with that of the same samples before freezing was found in tests by the Thunberg method. SKK

4 P 406
The use of inhibitory media to screen South Dakota bulk tank milk for Streptococcus agalactiae.
Kirkbride, C. A.; Shave, H.; Blades, J.
Journal of Milk and Food Technology **35** (11) 629-631 (1972) [21 ref. En] [S. Dakota Animal Disease Res. and Diagnostic Lab., St. Univ.. Brookings, 57006, USA]

Edward's medium with red blood cells, staphylococcus β-toxin and ferric citrate (TKT medium) was used to culture 4189 bulk tank milk samples from herds supplying 7 dairy plants in South Dakota. Identity of organisms with characteristics of Streptococcus agalactiae on TKT was tested biochemically. The incidence of Str. agalactiae-infected herds supplying the 7 milk plants ranged from 0 to 66.6% and averaged 4.03%. Difficulty was encountered in identifying Str. agalactiae by its characteristics on TKT alone so that only about 10% of colonies picked as Str. agalactiae from TKT had all the characteristics of this organism. Some limitation of the method for use in Str. agalactiae eradication is thus indicated. Modified KF agar [Difco KF streptococcus agar + aesculin + ferric citrate] was found unsuitable for the direct isolation and identification of Str. agalactiae from bulk tank milk. AS

4 P 417
[Effect of pasteurization on chlorophos content of milk.]
Sorokina, O. F.; Chervyakova, G. G.
Trudy, Vologodskii Molochnyi Institut No. 64, 151-155 (1972) [5 ref. Ru]

Chlorophos was added to milk at 0.2 mg/l. and the milk was pasteurized at 72-76°C, or the heat treatment was omitted and the milk was incubated with Streptococcus lactis, Str. cremoris, Lactobacillus bulgaricus and L. acidophilus. Chlorophos was not detected in pasteurized milk by a TLC method, but other chemical substances, which were not identified, occurred on the silica gel plate. The acidifying activity of the bacteria tested was not significantly affected by the presence of chlorophos at the above concn. FL

4 P 423

[Microbiological studies of fermented milk products. Proteolytic activity of Streptococcus thermophilus and Lactobacillus bulgaricus in yoghurt.]

Formisano, M.; Percuoco, G.; Percuoco, S.

Industrie Agrarie **9** (12) 430-435 (1971) [23 ref. It, en] [Istituto di Microbiol. Agraria, Univ., Naples, Italy]

Hydrolysis of casein was demonstrated by whole cells of L. bulgaricus, by the centrifugal supernatant from lysozyme treatment of L. bulgaricus and by the centrifugal sediment from lysozyme treatment of Str. thermophilus or L. bulgaricus. The proteolytic activity in each case decreased as the pH decreased from 7 to 4. Proteolysis was assessed at 4 stages of yoghurt manufacture using the 2 microorganisms alone or in combination; it was greatest with L. bulgaricus alone, Str. thermophilus being presumed to utilize the products of proteolysis when the 2 microorganisms were used together. The initial rate of accumulation of products of proteolysis declined rapidly after refrigeration of the yoghurt, presumably due to the temp. and to the lower pH. JMD

4 P 521

[Effect of some biological factors on appearance of rusty discoloration in White pickled cheese.]

Murgov, I. D.; Baltadzhieva, M. A.

Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (2) 183-191 (1970) [6 ref. Bg, ru, fr] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]

White pickled cheeses were made from raw and pasteurized cows' and ewes' milk without starter or with a cheese (Streptococcus lactis + Lactobacillus casei) or yoghurt (Sr. thermophilus + L. bulgaricus) starter; the coagulum was cut using knives contaminated with L. plantarum var. rudensis, the causative organism of rusty discoloration [see FSTA (1971) **3** 10P1668]. Ewes' milk cheese proved more susceptible to discoloration than did cows' milk cheese; the cheese starter had a greater stimulatory effect on pigment production than the yoghurt starter, and more pigment was produced in raw-milk than in the pasteurized-milk cheese. 15 of 20 yeast strains isolated from cultured milk products stimulated pigment formation when grown on hydrolysed milk agar with L. plantarum var. rudensis; 1 strain of Saccharomyces casei, 3 of Sacc. lactis and 2 unidentified strains of Saccharomyces were the most stimulatory. SKK

5 P 569

[Abstracts of papers of a scientific-technical conference commemorating 100 years of Yaroslavl cheesemaking.] Tezisy dokladov nauchno-tekhnicheskoi konferentsii posvyashchennoi 100 letiyu Yaroslavskogo promyshlennogo syrodeliya. [Book]

Krasheninin, P. F. (Editor)

110pp. (1970) [Ru]

(Continued from preceding abstract.) Use of sorbic acid for the prevention of mould growth on hard cheese during ripening, by R. Ramanauskas (pp. 36-37); Characteristics of ripening of cheese of Chanakh-Tushinskii types, by Z. Kh. Dilanyan & D. T. Magak'yan (pp. 38-40); Use of trace elements in pickled cheese manufacture, by Z. Kh. Dilanyan, A. A. Agababyan, R. V. Asakyan & R. A. Amirkhanyan (pp. 40-42); Variability of lactic acid bacteria, by Z. Kh. Dilanyan & S. Sh. Ter-Kazar'yan (pp. 43-45); Composition of cultures for cheeses made using low scalding temperatures, by A. V. Cudkov, I. I. Klimovskii & V. I. Zvyagintsev (pp. 45-47); Physiological and biochemical properties of lactic acid bacteria isolated from starters for cheeses with low scalding temperatures, by I. I. Klimovskii, A. V. Gudkov, V. I. Zvyagintsev & G. A. Kalinina (pp. 47-51); Use of nisin-producing cultures in cheese manufacture, by S. N. Karlikanova & A. V. Gudkov (pp. 51-53); Effect of different bacterial cultures on Soviet cheese quality, by Z. Kh. Dilanyan, L. A. Ostroumov & E. K. Matyeeva (pp. 53-54); Effect of bacterial composition of starters on microbiological processes in Dutch brick cheese, by V. P. Krylova & A. P. Blousova (pp. 54-57); Bacterial preparation 2 and its uses in the manufacture of small hard cheeses, by G. Belova, A. Manenkova, I. Klimovskii & P. Krasheninin (pp. 57-58); Use of salt-resistant microorganisms in starters for Rossiiskii cheese salted in grain, by F. A. Fedin & A. V. Gudkov (pp. 59-60); Effect X-ray mutants of lactobacilli on the acceleration of ripening of Armansk cheese, by Z. Kh. Dilanyan & R. S. Sarkisyan (pp. 60-61); Carbonyl compounds in starters, by G. V. Borisova, V. F. Kriventsova, G. G. Block & V. V. Slivko (pp. 61-63). (Continued in following abstract.) FL

5 P 570
[Abstracts of papers of a scientific-technical conference commemorating 100 years of Yaroslavl cheesemaking.] Tezisy dokladov nauchno-tekhnicheskoi konferentsii posvyashchennoi 100 letiyu Yaroslavskogo promyshlennogo syrodeliya. [Book]
Krasheninin, P. F. (Editor)
110pp. (1970) [Ru]

(Continued from preceding abstract.) Possibility of using insoluble chymotrypsin preparations for milk coagulation, by T. V. Dolgi'kh, V. I. Zvyagintsev, I. I. Klimovskii & L. I. Ginodman (p. 64); Eliminating bitterness in cheese, by V. I. Zvyagintsev, Z. P. Medvedeva & I. P. Buzov (pp. 65-66); Selection of thermophilic lactic acid bacteria and study of changes in the paracasein complex in cheese manufacture, by P. F. Dyachenko, involving cheddaring, E. V. Shchedushnov (pp. 66-67); Role of oxygen in milk ripening, by A. N. Gritsenko (pp. 68-69); Changes in the fat during ripening of rindless cheese wrapped in polymer film, by L. A. Kachtova & L. V. Vorob'eva (pp. 69-70); Characteristics of 'Pikant' cheese in relation to protein breakdown products, by F. V. Chasov (pp. 70-72); Effect of pepsin on the development of bitter flavour in cheese, by A. N. Tolkachev & V. I. Zvyagintsev (pp. 72-73); Possibility of using enzyme preparations from Aspergilus candidus (strain II) and Bacillus mesentericus-renninus in Dutch cheese manufacture, by Zh. I. Durova, T. A. Petina & M. S. Mosichev (pp. 73-75); Proteolytic properties of some rennet substitutes, by E. G. Sergeeva & V. I. Zvyagintsev (p. 75); Possibility of using pancreatin for accelerating cheese ripening, by L. V. Arsenova (pp. 76-77); Changes in the contents of some volatile fatty acids during Dutch cheese ripening, by I. U. Ramazanov, V. I. Alekseev & A. V. Gudkov (pp. 77-79); Amino acids composition of round Dutch cheese, by I. U. Ramazanov, V. I. Alekseev & A. V. Gudkov (pp. 79-80). (Continued in following abstract.) FL

5 P 573
The influence of lactobacilli on open texture in Cheddar cheese.
Hoglund, G. F.; Fryer, T. F.; Gilles, J.
New Zealand Journal of Dairy Science and Technology **7** (4) 159-160 (1972) [5 ref. En]
[New Zealand Dairy Res. Inst., Palmerston North]

A total of 96 Cheddar cheeses made at a commercial factory on 4 consecutive days in Sept., Nov. and Feb. using paired single-strain homofermentative starters, were examined at intervals during ripening for citrate utilization, non-starter lactic acid bacteria (lactobacilli and pediococci) and open texture. Overall correlation coeff. between age and score for texture was 0.82. Cheeses made in February showed an increase in rate of development of open texture, and also contained the highest initial numbers of non-starter lactic acid bacteria. Citrate utilization was not essential for development of open texture. In further experimental cheeses, average numbers of non-starter lactic acid bacteria and degree of open texture increased with storage temp. ($P<0.005$ and $P<0.01$ respectively) regardless of the month of manufacture or age of the cheese. CDP

5 P 576
[Manufacture of Norwegian Saint-Paulin cheese.]
Aarnes, G.; Kvakkestad, A. O.; Strand, A. H.
Meieriposten **61** (42) 992-1002; (43) 1010-1021; (44) 1038-1042 (1972) [No]

In an experiment in 48 cheese vats (each with 250 l. whole milk) the principal effects of adding (i) Lactobacillus helveticus in the proportions 0.1, 0.2 and 0.3%, (ii) 30, 40, 50 and 60% water at 33°C (in 2 equal parts) to the whey after the completion of scalding and (iii) 0, 500, 1000 and 1500 g salt/100 l. water and of (iv) 0, 2, 4 and 6 h brining (at 9°C and 20-22% salt concn.) were as follows. (i) There was no significant variation in total bacterial and lactobacilli counts, both being 100-200 $\times 10^6$/g. (ii) The final titratable acidity of the whey decreased while the pH of fresh cheese and ripened cheese and the soluble N/total N ratio rose slightly. (iii) The pH of ripened cheese fell from approx. 5.53 to 5.4; the salt content of the cheese serum rose from about 1.5% to 2%. There was a curvilinear increase in the moisture content and the SNF content. The percentages of soluble N and amino-N in the total N both fell. (iv) The rise in pH during ripening was inhibited; the salt content of the cheese and cheese serum showed a curvilinear increase whereas the moisture content fell. The fall in the amino-N content was almost linear. The cheese body score, overall quality, flavour and aroma all reached an optimum with 4 h brining. In a 2nd experiment in 15 vats, cheese inoculated with 0.5% Lactobacillus starter showed higher soluble N and amino-N levels after 4 months' ripening than non-inoculated cheese. ADL

5 P 578
The concentration of lactic acid bacteria used in cream ripening.
Lacrosse, R.
Lait **52** (519/520) 622-628 (1972) [6 ref. Fr, en] [Sta. laitiere de l'Etat a Gembloux, Belgium]

A starter containing Streptococcus diacetilactis and Leuconostoc cremoris was cultured for 24 h at 30°C in meat extract/tryptone/peptone/lactose medium, and then concentrated by centrifugation at 17 000 × g_n, and stored at -20°C. A storage temp. of -30°C was necessary if the concentrated starters were to be kept for >3 months. Experiments with these concentrated cultures showed that the amount required for use in the preparation of butter starters was only 5-10% of that of non-concentrated cultures. The concentrated cultures were not suitable for direct inoculation into the cream. CDP

5 P 626
Effect of dieldrin on bacteria producing lactic acid.
Hantke, W. E.; Bradley, R. L., Jr.
Journal of Milk and Food Technology **35** (11) 655-658 (1972) [14 ref. En] [Dept. of Food Sci., Univ. of Wisconsin, Madison, 53706, USA]

Growth of Streptococcus cremoris, Str. lactis and a mixed commercial culture was studied in the presence of 0.5 and 5 ppm dieldrin. With each culture, acid production after 5 h at 32°C in lactose broth was decreased by approx. 30-50% in the presence of 0.5 ppm dieldrin. In skim-milk or whole milk, the addition of dieldrin caused only a slight decrease in acid production. Addition of milk proteins (α-lactalbumin, β-lactoglobulin or casein) to lactose broth reduced the inhibition of acid production, with α-lactalbumin being most effective when the concn. of dieldrin was low. When the test microorganisms were grown in Elliker broth with 5 ppm dieldrin, centrifugation and ether extraction of the culture after 24 h at 22.2°C revealed that a large proportion of the dieldrin was tightly bound to the surface or adsorbed into the cells. The possible effects of dieldrin on cell enzymes is discussed briefly. MEG

5 P 632
[Method of obtaining starter for Armenian cheese.]
Dilanyan, E. Kh.; Makaryan, K. V.; Sarkisyan, R. A. (**USSR**, Erevanskii Zooveterinarnyi Institut)
USSR Patent 343 489 (1972) [Ru]

In a process involving separate cultivation of lactobacilli and lactic streptococci, cheese maturation is accelerated by using X-ray mutant strains Lactobacillus casei 7/1, L. helveticus 31/1 and L. helveticus 51/5. The streptococci used are preferably Str. lactis strains 55, 662 and 869, and Str. diacetilactis strains 730 and 877. W&Co

5 P 667
[Degradation of α_s-, β- and κ-casein by suspensions of lactic acid bacteria.]
Rymaszewski, J.; Poznanski, S.; Markowicz-Robaczewska, M.
Lait **52** (518) 571-585 (1972) [23 ref. Fr, en] [Inst. Inzynierii i Biotech. Zywnosci, WSR, Olsztyn, Poland]

Streptococcus lactis T_1 and Str. diacetilactis 157 possessed higher caseolytic activities [estimated from quantities of pH 4.6-soluble N and available groups of α-amino N] than did Str. cremoris 319. Degradation of β- and κ-casein in whole casein was more intense than that of α_s-casein. In general, there were 2 pH optima (pH 5.6 and 7.0) for proteolytic activity. Each of the strains tested had its own characteristic pattern of casein hydrolysis indicating that each had a different system of peptidohydrolases; this is in agreement with work reported previously on the electrophoretic separation of peptides from tryptic digests of κ-casein. [See Bull. Acad. pol. Sci., Cl. II. Ser. Sci. biol. **16** (10) 609-13]. CDP

6 P 768
[Stimulation of lactic acid bacteria by products of thermophilic methane fermentation.]
Khandak, R. N.; Mikhlin, E. D.; Gudkov, A. V.
Prikladnaya Biokhimiya i Mikrobiologiya **8** (6) 901-907 (1972) [7 ref. Ru, en] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

5 fermentation products of an acetone-butyl mash (in the form of aqueous extracts of a dried biomass or whole culture medium) all stimulated the growth of Streptococcus cremoris, Str. diacetilactis, Str. paracitrovorus, Str. faecalis, Str. lactis, Lactobacillus plantarum, L. buchneri and L. casei in skim-milk, the rate of acid formation and the increase in cells being 3-6 × greater than in the controls. In natural milk the rate of growth increased in the logarithmic phase, whereas in reconstituted milk the lag phase was shortened. The optimum concn. was 30-50 mg % DM in natural milk and 20-40 mg % in reconstituted milk. ADL

6 P 786
Production of cheese starter concentrates.
Condon, S.; Cogan, T. M.
Farm and Food Research **4** (1) 7-8 (1973) [En] [Dept. of Dairy and Food Microbiol., Univ. Coll., Cork, Irish Republic]

6 P 790

[Effect of an activator on development of cultures for fresh cheese manufacture.]

Krsev, L.

***Mljekarstvo* 22** (12) 266-272 (1972) [5 ref. Sh] [Zagrebacka Mljekara, Zagreb, Yugoslavia]

Reconstituted spray-dried skim-milk was autoclaved at 120°C for 20 min and inoculated with 2% cultures of Streptococcus lactis, Lactobacillus casei, Str. diacetilactis or Str. cremoris strains singly or in 2 different mixtures (proportions not stated), with or without addition of 0.02-0.2% of 'Lac-Val' (an activating substance of French manufacture said to contain yeast extract, some amino acids B-group vitamins). Cultures were incubated for 3-12 h and acid formation, coagulation the and multiplication of the microorganisms were measured. It is concluded from tabulated and graphically presented results that the activator reduced the lag phase of growth of the culture bacteria and promoted rapid and satisfactory acidification; optimum concn. of the activator was 0.04-0.06%. SKK

6 P 825

Effect of various concentrations of formalin on the bacterial flora of milk and growth of some species.

Abo-Elnaga, I. G.; Abdel-Motaleb, L.; El-Gindi, S. M.

***Zentralblatt für Veterinärmedizin, B* 19** (6) 479-485 (1972) [7 ref. En, de, fr, es] [Dairy Dept., Fac. of Agric., Assiut Univ., United Arab Republic]

Up to 0.02% commercial (36-40%) formalin solution was added to samples of raw milk which were then stored at 30° or 5°C. The reduction in both total and coliform counts was greater at 30° than at 5°C. Formalin appeared to have no selective action on the milk microflora as microorganisms present in large numbers at the beginning usually predominated after storage. After addition of 0, 0.004, 0.01 and 0.02% formalin, respectively, to raw milk, acidity remained unchanged for <2, 2, 2 and 12 h at 30°C and for 2, 6, 12 and 24 h at 5°C; correspondingly, clot-on-boiling test was positive after 12, 48, 48 and >48 h at 30°C, and after >48 h in all cases at 5°C. In pure culture in litmus milk containing formalin, Staphylococcus sp. and lactic acid bacteria (other than Lactobacillus casei and Streptococcus faecalis) were sensitive to 0.004% formalin; Str. faecalis was sensitive to 0.008% formalin while L. casei was able to tolerate this concn. when present at levels of 10^7 but not 10^3/ml. Escherichia coli and Bacillus subtilis tolerated 0.02% when present in large numbers (10^7/ml) and micrococci and yeasts were the most resistant, even at levels of 10^3/ml. CDP

6 P 833

Lactase potential of various microorganisms grown in whey.

Wierzbicki, L. E.; Kosikowski, F. V.

***Journal of Dairy Science* 56** (1) 26-32 (1973) [29 ref. En] [Dept. of Food Sci., Cornell Univ., Ithaca, New York 14850, USA]

Strains of 6 moulds (Aspergillus phoenicis, Asp. niger, Asp. oryzae, Neurospora crassa, Mucor pusillus, and M. miehei), 3 yeasts (Saccharomyces lactis, Sacc. fragilis and Candida pseudotropicalis) and 7 bacteria (Streptococcus lactis, Str. thermophilus, Str. cremoris, Lactobacillus bulgaricus, L. helveticus, Leuconostoc citrovorum and Leuc. paracitrovorum) were grown in deproteinized whey media supplemented with appropriate nutrients, and lactase activities at the optimum pH and temp. were measured. The moulds had the lowest lactase activity but the highest cell yields, whereas the bacteria and yeasts generally had high lactase activity and low cell yields. The optimum pH for lactase activity was 3.5-5.5 was Aspergillus and Mucor spp., 4.5-7.0 for Neurospora spp., 6.0-7.0 for yeasts and 5.0-6.5 for bacteria; optimum temp. for activity was 40-55°C for moulds and 30-50°C for yeasts and bacteria. Air drying or sonic disintegration of the cells or treatment with chemicals (such as ethanol, acetone, either or toluene) before freeze-drying, decreased the lactase activity of Asp. phoenicis, but increased that of Sacc. fragilis and L. helveticus. MEG

6 P 870

[Biochemical changes in milk in different methods of culturing kefir grains.] In "Sbornik Trudov Nauchno-tekhnicheskoi Konferentsii, Leningradskii Tekhnologicheskii Institut Kholodil'noi Promyshlennosti, Tekhnologicheskaya Sektsiya".
Krasnikova, L. V.; Novotel'nov, N. V.; Shmeleva, L. I.
pp. 22-27 (1970) [10 ref. Ru] Leningrad, USSR, Leningradskii Tekhnologicheskii Institut Kholodil'noi Promyshlennosti

Bulk production of kefir is considered to offer many technological advantages over the in-bottle method but to be hampered by the batch preparation of starter in use at present in the USSR. A laboratory installation for continuous preparation of kefir was constructed, consisting of a 6-l. culturing vessel provided with a mechanical stirrer. Kefir grains and milk (1:20 v/v) were placed in the vessel between 2 sieves, and fermentation was allowed to proceed without stirring until the milk reached an acidity of 80-85°T; acidity was then reduced to 50-55°T by addition of fresh milk and continuous production was carried out at 20-22°C by allowing milk to flow through the installation at the rate of 1.2 l./h. The product leaving the installation was bottled and allowed to ripen at 12-14°C. For comparison, batch kefir was prepared and stored at the same temp. The 2 types of kefir were examined initially and after storage for 24, 48 and 72 h; pH, titratable acidity, lactic acid, ethanol, CO_2, free amino acids, and counts of streptococci, lactobacilli and yeasts were determined. It is concluded from tabulated results that kefir prepared by the continuous method was in all respects equal to that produced by the batch method. SKK

6 P 873

[Effect of various microbial rennets on acidifying activity of lactic acid bacteria of importance to dairy technology.]
Havlova, J.; Dolezalek, J.
Prumysl Potravin **24** (2) 51-53 (1973) [3 ref. Cs, de] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Effects were studied of Meito Rennet preparation from Mucor pusillus Lindt (Japan), Mikrozym preparation from Bacillus subtilis (Czechoslovakia), Rennilase preparation from Mucor miehei (Denmark) and Sure Curd preparation from Endothia parasitica (USA) on the acidifying activity of the Laktoflora FD (Czechoslovakia) 'cream' starter (Streptococcus lactis, Str. cremoris, Leuconostoc citrovorum and Leuc. dextranicum), the Laktoflora Emmental cheese starter (Str. thermophilus and Lactobacillus helyeticus), and L. casei hard cheese starter. Laktotochym rennet (Czechoslovakia) was used for comparison. Values for titratable acidities and (in some instances) pH of the different starters after incubation at the appropriate temp. for 0-20 h were determined. All microbial preparations, Mikrozym and Sure Curd in particular, enhanced the activity of the 'cream' starter. All microbial preparations and also the rennet preparation inhibited to some extent the activity of the Emmental cheese starter. Mikrozym markedly stimulated L. casei activity; the other preparations had no such effect. SKK

1 B 4
Malt extract as protective medium for lactic acid bacteria in cryopreservation.
Johannsen, E.
Journal of Applied Bacteriology **35** (3) 423-429 (1972) [25 ref. En] [Nat. Chem. Res. Lab., Council for Sci. and Ind. Res., Pretoria, South Africa]

6% barley malt extract and 10 and 30% sorghum malt extract compared favourably with well known protective media such as 10% dimethyl sulphoxide for protecting Lactobacillus leichmannii during freezing and storage at -196°C. Survival after 3 days' storage was approx. 99%, and 93-99% of the acid producing ability was retained. When malt extracts were used as protective media for frozen storage of 32 strains of thermophilic and mesophilic lactic acid bacteria for 3 days at -196°C, survival averaged 90%. Malt extracts from barley and sorghum grain are recommended for use in production of frozen starters in various branches of the food industry. CDP

1 H 66
[Production of high quality Fraga wine.]
Zinchenko, V. I.; Unguryanu, M. N.; Arkhipova, V. V.
Sadovodstvo, Vinogradarstvo i Vinodelie Moldavii **27** (2) 22-25 (1972) [Ru] [Kishinevskii Politekhnicheskii Inst. im. S. Lazo, USSR]

Effect was studied of enzyme preparations on the methyl alcohol content of fermented Noah must, and a method for reducing the methyl alcohol content of Fraga wine, produced from the must, was developed. The following preparations were investigated: pectolytic Avamorin-16, which has a pectin ester (PEA) activity of 11.6 units; Nigrin OP-1 (PEA, 6.6 units); Aspergillus niger (PEA, 17.5 units); and cytolytic Cytorozemin P 10× (PEA, 3.3 units). A 0.05% concn. of the preparations was added. The effect of heating the must on the methyl alcohol content was also studied. Heating the expressed juice to 80°C for 1 min for inactivation of pectin esterase, rapid cooling to 20°C, use of Cytorozemin P 10× (50 g/100 kg juice), 18-h fermentation at 20°C, and fortification proved the most suitable technique. STI

1 H 158
The ecology and classification of strains of Lactobacillus collinoides nov. spec.: a bacterium commonly found in fermenting apple juice.
Carr, J. G.; Davies, P. A.
Journal of Applied Bacteriology **35** (3) 463-471 (1972) [12 ref. En] [Long Ashton Res. Sta., Univ. of Bristol, UK]

Most heterofermentative lactic rods occurring throughout the cider industry are quite similar and form a fairly coherent group. The constituent bacteria are sufficiently different from other heterofermentative lactobacilli to be considered a new species. They have, therefore, been named Lactobacillus collinoides nov. spec. These occur most frequently in factories where SO_2, the only permitted preservative, is either used in small quantities or not at all. AS

1 J 80
[Dried miso preparation.]
Ajinomoto Inc.
Japanese Patent 26 719/72 (1972) [Ja]

Dried miso is prepared by allowing a liquid enzyme derived from Aspergillus oryzae to act on steam-cooked or exoleated soybean. The composition is then salted and subjected to the action of yeast and lactic acid bacteria prior to drying. IFT

1 K 5
Isolation and characterization of microorganisms involved in the fermentation of Trinidad's cacao beans.
Ostovar, K.
1143bc **33** (1) 344: Order no. 72-19 360 (1972) [En] [Pennsylvania St. Univ., University Park, USA]

The microflora of cocoa beans fermenting in sweat-boxes at (i) Centeno Estate, (ii) San Louis Estate and (iii) The University of West Indies was investigated. Samples were taken at depths of 5, 45 and 90 cm at intervals during fermentation periods of ⩽7 days. 256 pure cultures were isolated, and 10 families, 26 genera and 54 species were isolated. Initial and final microbial counts were, respectively: (i) 1.48×10^5/g and 4.1×10^5/g; (ii) 6.8×10^5/g a 9.2×10^5/g; and (iii) 2.6×10^5/g and 1.3×10^7/g. The initial microflora was dominated by yeasts. As fermentation progressed, Zymomonas mobilis, Lactobacillus spp., Streptococcus thermophilus, Acetobacter roseus and Bacillus spp. dominated in (i), Streptococcus thermophilus and Bacillus spp. dominated in (iii), and Pseudomonas spp., Aerobacter aerogenes and Escherichia coli dominated in (iii), resulting in the appearance of undesirable odours. The microflora of dried and polished cocoa beans consisted largely of Bacillus and Micrococcus spp.; the microflora of fruit flies (Drosophila melanogaster) and dried pulp from sweat boxes correlated closely with that of fermenting cocoa beans. AJDW

1 R 64
[Process for the improvement of fish and fish products.] Verfahren zur Verbesserung von Fischen und Fischerzeugnissen.
Molkereigenossenschaft Dahlenburg GmbH
German Federal Republic Patent Application 2 046 356 (1972) [De]

After being cut up into fillets, fish is treated with penetrating ferment systems found particularly in strongly reducing lactobacilli, e.g. L. plantarum, L. bulgaricus, Streptococcus acidopholus, Streptococcus lactis, etc., contained in sour milk products, e.g. whey, curd or yoghurt, or in lactic acid fermentation products, e.g. pickled cabbage (juice). The systems break down amines, e.g. trimethylamine oxide, and hydrate unsaturated compounds e.g. clupanodenic acid, into substances which do not have an unpleasant smell or taste. W&Co

1 S 90
Improved culture cuts sausage production time.
Anon.
Food Processing **33** (8) 32 (1972) [En]

A new 2-strain lactic acid starter culture of Pediococcus cerevisiae plus Lactobacillus plantarum produces the typical tang in Genoa salami, Italian salami, hard salami, Holsteiner Cervelat, Land-jäger, cappicola, summer sausage, thuringer, pepperoni, Lebanon bologna, and chorizos. Production time of 72-120 h by traditional methods is reduced to 10-16 h using the 2-strain starter culture. OA

2 C 41
Interactions of food starter cultures and food-borne pathogens: Streptococcus diacetilactis versus food pathogens.
Daly, C.; Sandine, W. E.; Elliker, P. R.
Journal of Milk and Food Technology **35** (6) 349-357 (1972) [43 ref. En] [Dept. of Microbiol., Oregon St. Univ., Corvallis, 97331, USA]

The ability of Streptococcus diacetilactis to inhibit a variety of food spoilage organisms and pathogens in milk and broth cultures was demonstrated. Test organisms included Pseudomonas and Alcaligenes spp., Salmonella, Stapylococcus aureus, Clostridium perfringens and Vibrio parahaemolyticus. In general, approx. 99.0 and 99.9% inhibition was observed in milk and broth, respectively. Possible practical applications of the inhibition were examined. Addition of Str. diacetilactis extended the shelf life of artificially contaminated Cottage cheese and prevented proteolysis in milk at 7.5°C by Pseudomonas fluorescens. Staphylococcus aureus was inhibited >99% in vanilla cream filling, ham sandwich spread, chicken gravy, soya milk, and ground beef stored at 25°C for 24 h. Development of the Gram-negative flora of ground beef was also inhibited >99% after storage at 7.5°C for 7 days. Possible roles of several factors in the mechanism of inhibition by Str. diacetilactis are briefly discussed. The effects of pH reached and acids produced by Str. diacetilactis on the growht of Staph. aureus are described. A greater role of the lactic acid bacteria in fermentations in the food industry is suggested. AS

2 F 87
Studies on the bacterial flora of vacuum-packaged fresh beef.
Roth, L. A.; Clark, D. S.
Canadian Journal of Microbiology **18** (11) 1761-1766 (1972) [14 ref. En, fr] [Div. of Biol. Sci., Nat. Res. Council of Canada, Ottawa.]

Vacuum-packaging of fresh beef in a gas-impermeable film (vinylidene chloride-vinyl chloride copolymer), as compared to packaging in a gas-permeable film (polyvinyl chloride) reduced the growth rates of most incident bacteria (lower total aerobic and anaerobic counts), favoured the development of lactobacilli, and markedly increased the odour and colour shelf-life during storage at 5°C. The growth rate of both aerobes and anaerobes on meat packaged in vinylidene chloride (VC) film was about 1/8 of that of meat packaged in the polyvinyl chloride (PVC) film. The flora of VC-packaged samples consisted largely of lactobacilli (50-70%) while that of PVC-packaged samples consisted mostly of pigmented pseudomonads and Microbacterium thermosphactum (collectively 60%). Exposure of VC-packaged samples to air changed the microflora to one resembling that of samples initially packaged in PVC film. VC-packaged meat did not undergo noticeable changes in odour or colour even after 32 days of storage while meat stored in PVC developed off-colour (brown) and off-odour (putrid) in 5 days. The colour shelf-life in PVC film of beef previously stored in VC film was 3 days regardless of how long the meat was stored in the latter film before repackaging. AS

2 H 307
[Process for the microbiological detection of pediococcal contamination of beer in the brewery.]
Verfahren zum mikrobiologischen Nachweis von Infektionen durch bierschädliche Pediokokken in der Brauerei.
Emeis, C.-C. (**Federal Republic of Germany**, Versuchs- & Lehranstalt für Brauereien in Berlin)
German Federal Republic Patent Application 1 673 280 (1972) [De]

Pediococci are detected by using a solid culture medium containing: hopped wort; acetic acid or its salts (e.g. 0.05-0.4 g/l. sodium acetate) as growth factor for lactic acid bacteria; 0.2-0.4% β-phenylethyl alcohol, which inhibits growth of most bacteria but not pediococci in beer; 0.01-0.10% Tween 80, to promote absorption of material by microorganisms; 2-6 mg/l. Acti-dione, to inhibit growth of yeast; soluble starch and gelatine, to promote growth of pediococci; liver extract, to inhibit aerobic accompanying flora; and bromocresol green which turns yellow on reaction with acid and facilitates identification of colonies of microorganisms. In 2-6 days, small white colonies of pediococci appear on the surface. W&Co

2 R 124
[Growth of microbial contaminants in semi-preserved fish marinades and storage life of the preserves at different temp. and vinegar concentrations.]
Emberger, O.
Prumysl Potravin **23** (11) 347-349 (1972) [18 ref. Cs, ru, en] [Mikrobiologicky Ustav Lekarske Fak. Hygienicke, Prague, Czechoslovakia]

Batches of 10 samples of marinades of (i) semi-preserved fish in mayonnaise, (ii) semi-preserved fish in vinegar and (iii) heat-treated semi-preserved fish were stored either for 7 days at 5°C or for 1 day at 20° and 6 days at 5°C, or for 3 days at 20° and 4 days at 5°C or for 5 days at 20°C, and then were examined microbiologically and organoleptically, batches examined initially serving as controls. In further tests, effect of storage for 7 days at 5°C or 5 days at 20°C were studied with (i)-(iii) made to contain either 0.5-1.0, or 1.1-1.5 or 1.6-2.0% acetic acid. Yeasts multiplied vigorously in (i)-(iii), low temp. and high concn. of acetic acid (1.6-1.8%) being markedly inhibitory. There was marked correlation between extent of spoilage and yeast counts. Other microbes, including lactobacilli, grew to some extent only in (i) but in insufficient numbers to cause spoilage. SKK

3 B 26
[Taxonomy and importance of the genus Streptococcus.] Taxonomie und Bedeutung der Gattung Streptococcus. [Review]
Hahn, G.
Archiv für Lebensmittelhygiene **23** (11) 229-236 (1972) [9 ref. De, en] [Inst. für Hygiene, Bundesforschungsanstalt für Milchforschung, Kiel, Federal Republic of Germany]

3 H 362
Juice beverages.
Eden-Waren GmbH
British Patent 1 287 379 (1972) [En]

3 H 397
[Experience regarding the biological stability of cask beer.] Erfahrungen mit der biologischen Haltbarkeit des Fassbieres. [Lecture]
Hank, T.
***Brauwelt* 112** (81) 1655-1664 (1972) [De, en, fr] [Bierbrauerei Becker OHG, St. Ingbert/Saar, Federal Republic of Germany]

The effects of malt on the biological stability of cask beer are discussed in this lecture, with particular reference to difficulties encountered in detecting lactobacilli. Techniques for taking samples from cakss and bottles are presented and the suitability of growth media is assessed. A rapid test for examination of yeast samples from fermenting vessels, and counts of contaminating microorganisms found in them are given. The effect of a special malt on the biological stability of beer was also examined. Hot wort was used in many of the tests. Methods of sterilization are described, and it is emphasized that low numbers of microorganisms can be detected only with the greatest difficulty when the smallest size of culture vessel (such as the 0.1 l. flask) is used. For examination of biological stability, larger vessels such as casks or pressure-resistant, large flasks are recommended, requireing incubation at 24°C. An apparatus for estimation of the number and size of small particles is described. The present criteria of number of microorganisms/l. must be amplified in low counts by the number of microorganisms/vessel, since this is the determining factor in spoilage in large vessels. AS

3 H 417
[Universal medium for detecting beer spoilage microorganisms.] Über einen Universalnährboden zum Nachweis von Bierschädlingen. [Lecture]
Kretschmer, K.-F.; Kretschmann, W.; Kretschmer, H.
***Brauwelt* 112** (88) 1815-1820 (1972) [13 ref. De, en, fr]

A new liquid medium (BSNB) for detection of beer spoilage microorganisms has been developed. It contains beer, glucose, brewer's yeast autolysate, peptonized milk and tomato pulp which stimulate in their own particular manner, the growth of lactobacilli, pediococci, wild yeasts and short rod bacteria. In house preparation of BSNB medium offers a financial benefit. Apparatus requirements are small, and the procedure is simple and reliable. Constant supervision of the yeast crop can be carried out in each brewery, irrespective of its size, since most primary beer defects have their origin in the fermenting cellar. TUB-IGB

3 J 354
[Halophilic lactic acid bacteria in fermented food manufacture IV. Nutrient requirement of lactic acid bacteria and yeasts in suguki making.]
Iwai, M.; Imahara, H.; Nakahama, T.
***Scientific Reports of the Kyoto Prefectural University, Agriculture [Kyoto-Furitsu Daigaku Gakujutsu Hokoku, Nogaku]* 23**, 163-167 (1971) [22 ref. Ja, en] [Lab. of Applied Microbiol., Fac. of Agric., Kyoto Prefectural Univ., Japan]

Conditions during suguki manufacture are especially favourable to the growth of the microorganisms involved, which suggests that possibly some growth factor was present in Brassica rapa L., and so a study was made of the nutritive requirements of the lactic acid bacteria and the yeast involved in the fermentation. The lactic acid bacteria, Lactobacillus plantarum, required the vitamins, pyridoxine, nicotinic acid, pantothenic acid, para-amino benzoic acid and biotin, and 17 amino acids with the exception of proline; the yeast which was identified as a strain of Saccharomyces rouxii, required only thiamine, pyridoxine, nicotinic acid, pantothenic acid and ammonium sulphate as an N source. [From En summ.] AA

3 J 417
The microbiology of frozen vegetables.
Splittstoesser, D. F.
***Food Technology* 27** (1) 54, 56, 60 (1973) [14 ref. En] [Cornell Univ., New York St. Agric. Expt. Sta., Geneva, 14456, USA]

A comparison of data between the author and frozen vegetable processors shows that most of the organisms constituting the microflora of frozen vegetables originate from contaminated processing equipment; and lactic acid bacteria are the predominant organisms. IFT

3 M 222
[Method for preparation of dough.]
Kataeva, A. A.; Vitavskaya, A. V.; Dolgikh, T. P.; Shamis, D. L.; Sokolov, P. I.; Goncharov, M. D. (**USSR**, Gosudarstvennyi Proektnyi Institut "Kazgipropishcheprom"; **USSR**, Institut Mikrobiologii i Virusologii AN Kazakhskoi SSR)
USSR Patent 344 826 (1972) [Ru]

In preparing dough by adding prepared liquid yeast and lactic acid bacteria, intensive accumulation of lactic acid is facilitated and the occurrence of "potato disease" in the bread is prevented by employing the mesophilic strain Streptococcus lactis var. diastaticus, which is preferably cultured before addition at 25-30°C for 6-8 h to a final acidity of 14-16°SH. In order to ensure high fermentative activity in the conditions of enhanced acidity, a yeast enzyme preparation obtained from beer yeast is preferably added in the initial stage. W&Co

4 B 37
[Method for identification of acetic acid and lactic acid bacteria. I. Establishment of suitable indicator for their identification.]
Tonchev, T. A.; Bambalov, G. K.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (2) 371-382 (1970) [8 ref. Ru, fr]

4 F 167
[Packaging of fresh meat and its keeping characteristics. II.] Verpackung von Frischfleisch und Hackbarkeit dieser Erzeugnisse. II.
Stein, M.; Kuchling, E.
Fleisch **26** (10) 194-195, 199 (1972) [11 ref. De] [Inst. für Fleischwirtschaft, Magdeburg, German Democratic Republic]
The storage characteristics of rolled meat, beef goulash and cutlets shrink-packaged in 0.02 mm polyethylene and stored at constant temp. were studied. Stability tests involving subsequent storage at 20°C served to establish the guaranteed quality storage times and selling period, as with packaged sausages. On the basis of the findings the saleability limit should be set at 48 h in view of the frequent temp. variations encountered in practice during production and transport. A safety factor has been incorporated in view of the binding nature of this period, by excluding meat dyes. The total aerobic count in the fresh packs was 30 000-150 000/g, lactic acid bacteria and streptococci predominating at the lower counts and Gram-negative organisms at the higher counts. [See FSTA (1973) **5** 3F90 for part I.] IN

4 H 538
[Relationship between technological procedure and microflora, and alcohol and tartrate yields in fermentation of pressed sweet marc. II. Study of lactic acid bacteria isolated from marc and piquette.]
Tonchev, T. A.; Banibalov, G. K.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (2) 383-395 (1970) [24 ref. Bg, ru, fr] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]
10 strains of lactic acid bacteria isolated from marc, 3 isolated from piquette and 1 isolated during manufacture of champagne-type wine were studied. 12 of the strains were homofermentative and were identified as Lactobacillus plantarum and 2 were heterofermentative and were identified as Bacterium tartarophtorum. All decomposed tartaric acid to a variable extent. SKK

4 H 619
[Changes in the composition of wine, induced by addition of lactic acid bacteria.]
Rabinovich, Z. D.; Bur'yan, N. I.
Vinodelie i Vinogradarstvo SSSR No. 4, 29-33 (1972) [5 ref. Ru] [VNIIViV "Magarach", USSR]
Changes in the chemical composition of wine induced by addition of lactic acid bacteria showed that in sour wines the malolactic fermentation is more often induced by heterofermentative cocci than by homofermentative rods. This is due to the low resistance of the rods to an acid medium. Reduced acidity, due to the cocci, was accompanied by a very slight increase in volatile acids. In less sour wines the heterofermentative cocci and rods participate in malolactic fermentation. In wines with a high pH the above microorganisms can utilize tartaric acid. STI

4 H 655
[Wine preservation.]
Takeda Chemical Industries Ltd.
Japanese Patent 45 517/72 (1972) [Ja]
Dialkyl sulphosuccinates are added to wines during or after processing to prevent microbial deterioration due to Lactobacillus spp. IFT

4 S 398
Microbiology of fresh beef in vacuum.
Brown, W. L.; Hoffman, A.
Proceedings of the Meat Industry Research Conference Mar., 45-52 (1972) [6 ref. En] [ABC Res. Corp., Gainesville, Florida, USA]
A study was conducted to collect data on differences in types and numbers of microorganisms present on fresh beef packaged in (i) Cry-O-Vac Saran bags vs. PVC film and (ii) film with low O_2 permeability vs. PVC film. Results of (i) emphasize the importance of packaging material and method of packaging in prolonging the shelf-life of fresh red meat. The bacterial counts of both Saran- and PVC-packaged samples were similar for 6 days storage at 32°F. The microbial numbers of samples packaged in PVC continued to increase thereafter, whereas samples packaged in Saran remained constant during the 15 day test period. The same trend prevailed in samples stored at 38 and 45°F, however microbial numbers of samples packaged in PVC increased at a faster rate. A storage temp. of 45°F was too high for proper storage of fresh red meat in either type of packaging. The types of bacteria isolated from Saran were mainly lactic acid bacteria with some pseudomonads and bacilli present. Pseudomonads predominated in PVC packaged meat and tended to be putrefactive. For (ii) the lower O_2 permeability film gave improved storage stability. AA

4 S 423
[Research into the effect of curing ingredients in relation to the accumulation of some acids and carbonyl compounds from Lactobacillus plantarum.]
Kyosev, D. D.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (2) 57-67 (1970) [15 ref. Ru, en]

A study was made of some curing ingredients, such as NaCl, $NaNO_3$, glucose and calcium citrate, used in the production of dry, non-perishable sausages, to determine the effect their presence has upon the ability of L. plantarum to accumulate the substances which determine the flavour and aroma of these sausages. In a meat-peptone agar medium, the following indices were determined: DM, pH, total acidity, amounts of lactic, butyric, propionic, acetic, pyroacemic and some other acids as well as the amounts of the diacetyl and acetoin. It was found that 5% NaCl in the medium inhibits the ability of L. plantarum to form acids while the presence of the nitrate and the glucose stimulates the accumulation of lactic, acetic, propionic and pyroacemic acids and diacetyl, and decreases pH considerably. The addition of calcium citrate does not essentially affect the changes in the quantities of the substances and the indices thus determined. AS

4 S 424
[Investigation of the effect of pure cultures from Lactobacillus plantarum on ripening and ageing of dry sausages.]
Kyosev, D. D.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **17** (2) 69-79 (1970) [18 ref. Ru, en]

A study was made of the effect of pure bacterial cultures from L. plantarum on the ripening and ageing of Panaghyurishto dry sausages. The indices determined were as follows: concn. of the nitrosopigment, pH of the medium, consistency of the product, amounts of diacetyl, acetoin, lactic acid, some volatile acids, and the titratable acidity and also the quantity of microflora. It was found that during ripening of dry sausages containing bacterial cultures, pH decreases more rapidly and larger quantities of the lactic, acetic and pyroacemic acids, from the diacetyl and acetoin of the nitrosopigment, are accumulated than is the case in dry sausages which lack cultures. AS

5 B 50
[Technological importance of streptococci.] Die technologische Bedeutung von Streptokokken. [Review]
Terplan, G.; Angersbach, H.
Archiv für Lebensmittelhygiene **23** (11) 244-247 (1972) [25 ref. De, en] [Tierärztliche Fak., Univ., 8 Munich 22, Federal Republic of Germany]

Glycolytic, proteolytic and lipolytic activities of the streptococci, their participation in the formation of flavour substances and structural changes in foods, their stimulatory or inhibitory influence on other organisms, and their resistance to heat are reviewed. The influence of these various activities, mainly but not invariably favourable, on the technology of milk and milk product is discussed. GTP

5 C 102
Lactic acid bacteria in food and health: a review with special reference to enteropathogenic Escherichia coli as well as certain enteric diseases and their treatment with antibiotics and lactobacilli. [Review]
Sandine, W. E.; Muralidhara, K. S.; Elliker, P. R.; England, D. C.
Journal of Milk and Food Technology **35** (12) 691-702 (1972) [186 ref. En] [Dept. of Microbiol., Oregon St. Univ., Corvallis, 97331, USA]

Recent literature concerning enteropathogenesis and drug resistance transfer factors in Escherichia coli are summarized as well as related papers concerning the use of antibiotics in animal feed. E. coli infection in swine (colibacillosis) also is considered, especially citations indicating the similarity between the disease in man and animals. The role of intestinal bacteria in human health is reviewed, emphasizing the importance of (a) a maintained balance of organisms in the adult, (b) breast feeding in infants to establish a large population of bifidobacteria and (c) the presence of Lactobacillus organisms to maintain healthful conditions in the human vagina. The use of Lactobacillus organisms in intestinal and vaginal disease therapy is reviewed as well as the important ecological role that lactic acid bacteria play in the natural scheme where man is concerned. AS

5 F 169
Microbial activities through wrapping materials.
Blankenagel, G.; Card, J. W.
Canadian Institute of Food Science and Technology Journal **5** (4) 222 (1972) [2 ref. En] [Dairy & Food Sci. Dept., Univ. of Saskatchewan, Saskatoon, Canada]

Nutrient transfer through the package may result in microbial growth on the outside of the wrapper and subsequent changes in the food. 10 different films used as casings or wrappers for meat products, including cellulose acetate sprayed on parchment paper, polyvinylidene chloride, cellulose acetate, irradiated polyethylene, laminated polyethylene and polyethylene, were examined. 5 cm diam. pieces were cut, autoclaved, placed on a solidified agar medium in a petri plate, the surface of the film streaked with one of the test organisms (Escherichia coli or Streptococcus lactis), incubated at 21° C for 18 h. Both test organisms formed visible growth on the surface of some '|films'| without being in direct contact with the substrate. Results with autoclaved samples were identical to those obtained with non-autoclaved materials. VJG

5 H 759
[Studies on lactobacilli isolated from mirin liquor. IV. Characteristics of some strains of Lactobacillus heterohiochi and Lactobacillus fermenti.]
Uchida, M.; Yokomura, S.; Nagahama, G.
Journal of Fermentation Technology [Hakko Kogaku Zasshi] **50** (5) 281-291 (1972) [24 ref. Ja] [Fushimi Res. Div., Takara Shuzo Co. Ltd., Fushimi-ku, Kyoto, Japan]

12 strains of hiochi bacteria (sake-putrefying lactic acid bacteria) were isolated from putrefied mirin liquor. The strains were heterofermentative and could not grow at temp. <15°C. Mevalonic acid was required for growth by 7 of the strains and these strains did not grow in glucose-meat extract medium. The other 5 strains did not require mevalonic acid for growth and grew in glucose-meat extract medium. Growth of L. heterohiochi isolated from mirin liquor was completely inhibited by 45% glucose, while L. heterohiochi from sake was inhibited by 35%. Ethanol inhibited growth of L. fermenti from mirin at 18% concn., and that of L. fermenti from sake at 10% concn. HK

5 H 760
[Studies on lactobacilli isolated from mirin liquor. V. Inhibitory effects of egg-white lysozyme on growth of lactobacilli from mirin liquor.]
Uchida, M.; Yokomura, S.; Nagahama, G.
Journal of Fermentation Technology [Hakko Kogaku Zasshi] **50** (5) 292-297 (1972) [14 ref. Ja]

Lactobacillus heterohiochi, L. fermenti, L. plantarum and L. casei isolated from mirin liquor were used as test organisms. Growth of these organisms was completely inhibited by 20 ppm lysozyme. >95% of the original activity of lysozyme added to mirin liquor remained after 1 yr of storage at room temp. No loss of lysozyme activity was observed after pasteurization at 65°C for 5 h. Clarification of mirin liquor by wheat gluten and persimmon tannin reduced lysozyme activity by 2.5%. Treatment of mirin liquor with gluten-tannin and 400 ppm activated carbon reduced lysozyme activity to 15% of its initial activity. Pasteurization o bottled mirin at 65°C for 10 min completely inhibited growth of hiochi bacteria. HK

5 H 773
Growth and activity of lactic acid bacteria in soymilk.
Gaddi, A. L.
Dissertation Abstracts International, B **31** (6) 3467: Order No. 70 20 841 (1970) [En] [Univ. of Wisconsin, Madison 6, USA]

Soymilk produced by comminuting Chippewa soybeans with water was used as a growth medium for lactic acid bacteria. Acid production by bacteria appeared to be dependent on their ability to utilize available sugars. Addition of protein digests resulted in formation of more acid by Streptococcus thermophilus, the Leuconostoc species and Lactobacillus pentosus, and less by Lactobacillus delbrueckii. Str. thermophilus, L. pentosus, L. delbrueckii and Leuconostoc mesenteroides produced sufficient acid to cause coagulation of soymilk. Heating soymilk to temp. ≤100°C reduced its suitability as a substrate, but more prolonged heating at 100°C or 120°C progressively improved this quality. L. delbrueckii and L. casei exhibited appreciable lipolytic activity in soymilk and MRS broth containing emulsified soybean oil, and S. thermophilus exhibited slight lipolytic activity. L. delbrueckii and S. thermophilus exhibited proteolytic activity in soymilk. PG

5 L 409
[Starch decomposition by isoamylase and pullulanase and its utilization.]
Yoshida, M.; Masuda, K.; Sakai, S.; Kurimoto, K.; Yokohayashi, Y.; Hirao, M.
Journal of the Starch Technological Research Society of Japan [Denpunto Gijutsu Kenkyu Kaiho] No. 40, 21-28 (1971) [23 ref. Ja] [Hayashibara Co., Ltd., Okayama, Japan]

Experiments were carried out to obtain the max. yield of maltose from starch. Commercial production of isomaltose was tried using Aerobacter aerogenes, Pseudomonas sp., Lactobacillus plantarum, Nocardia corallina, and Micrococcus lysodeikticus. All showed isoamylase activity, i.e. catalysed hydrolysis of α-1,6-glucosidic linkages in amylopectin. All the enzyme preparations hydrolysed starch almost completely to maltose in conjunction with β-amylase. The enzymes other than that from Pseudomonas may be called pullulanase, since they acted upon pullulan. SKa

5 R 221
Salmon canning waste water as a microbial growth medium.
Strasdine, G. A.; Melville, J. M.
Journal of the Fisheries Research Board of Canada **29** (12) 1769-1771 (1972) [9 ref. En, fr] [Fisheries Res. Board of Canada, Vancouver Lab., Vancouver 8, British Columbia]

Investigations were carried out to determine the suitability of salmon-canning waste water as a microbiological growth medium based upon its ability to support the growth of 6 bacterial spp. (Sorangium sp., Pseudomonas putrefaciens, Lactobacillus plantarum, Aerobacter aerogenes, Bacillus sp., and Streptococcus faecalis) both as a complete medium and as a source of available N. On this basis, the waste water compared favourably with 6 commercially available sources of N (trypticase, acidicase, polypeptone, peptone, phytone and meat extract) used routinely in microbiological growth media. Microbiological conversion of salmon canning wastes into useful and marketable products is discussed. VJG

6 H 888
[Effect of bacteriological condition of beer on its organoleptic quality. Consequences for manufacturing and control operations.] [Lecture]
Masschelein, C. A.
Brasserie Malterie Europe **23** (2) 19-24 (1973) [14 ref. Fr] [CERIA, B-1070, Brussels, Belgium]

Aspects discussed included the contribution of secondary products formed by contaminant microorganisms to beer taste and flavour, covering Enterobacteriaceae and Achromobacteriaceae in wort, and lactic acid bacteria, acetic acid bacteria and Saccharomyces diastaticus in beer. HBr

6 S 607
Non-enzymic in vitro formation of nitrosamines by bacteria isolated from meat products.
Collins-Thompson, D. L.; Sen, N. P.; Aris, B.; Schwinghamer, L.
Canadian Journal of Microbiology **18** (12) 1968-1971 (1972) [14 ref. En, fr] [Res. Lab., Health Protection Branch, Dept. of Nat. Health & Welfare, Ottawa, Canada]

The strains of bacteria used in this study were isolated from bologna batter, bacon, and a fermented sausage, and included strains of Pseudomonas fluorescens, Ps. aeruginosa, Pediococcus cerevisiae, Micrococcus sp., Staphylococcus aureus, Microbacterium thermosphactum, Lactobacillus sp., Streptococcus faecalis, Str. faecium, and Str. lactis; 3 strains of Escherichia coli obtained in pure culture were also tested. The organisms were tested for their ability to form nitrosamines with nitrate and nitrite and secondary amines. The formation in culture of dimethyl- and diethyl-nitrosamine from sodium nitrite and secondary amines was brought about by Streptococcus spp. but not by members of the other genera tested. This formation appeared to be non-enzymic and pH dependent, and may be catalysed by one or more bacterial metabolic products. AA

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J. NEWTON
ASSISTANT EDITOR

7 P 953
[Microbial lipolysis: lactic acid bacteria.]
Carini, S.; Kadaravek, G.; Lodi, R.
Scienza e Tecnica Lattiero-Casearia 23 (6) 377-388 (1972) [21 ref. It, en] [Istituto di Industrie Agrarie, Univ. di Milano, Italy]

Capacity to liberate fatty acids from milk and to hydrolyse tributyrin, naphthyl acetate and olive oil was examined for growing and resting cells of various lactobacilli and lactic streptococci and their cell-free extracts. Neither organisms nor extracts were found capable of hydrolysing butterfat or olive oil, any acidity developing through their activity arose solely from production of lactic acid and intracellular formation of fatty acids. However, some hydrolysis of tributyrin and naphthyl acetate was observed. GTP

7 P 903
Agar medium for differential enumeration of lactic streptococci.
Reddy, M. S.; Vedamuthu, E. R.; Washam, C. J.; Reinbold, G. W.
Applied Microbiology 24 (6) 947-952 (1972) [16 ref. En] [Dept. of Food Tech., Iowa St. Univ., Ames, 50010, USA]

7 P 904
Associative growth studies in three-strain mixtures of lactic streptococci.
Reddy, M. S.; Vedamuthu, E. R.; Washam, C. J.; Reinbold, G. W.
Applied Microbiology 24 (6) 953-957 (1972) [14 ref. En]

A recently developed differential agar medium [see preceding abstr.] was used to study associative growth patterns in 17 different heterologous, three-strain mixtures of Streptococcus lactis, Str. cremoris, and Str. diacetilactis grown in milk. Mixtures were made by combining equal volumes of 18-h milk cultures of the 3 spp. Relative populations of component species were followed through 3 successive transfers in milk after the initial mixed propagation. Direct evidence for strain dominance and compatibility was obtained. A procedure also was developed to estimate the extent of suppression of Str. lactis and Str. diacetilactis in a mixture containing a dominant Str. cremoris strain. The technique described could be successfully applied in quality-control work in the dairy-starter manufacturing industry. AS

8 P 1108
[Research work at the White-Russian Branch of VNIMI.]
Stavrova, E. R.; Chistyakova, M. N.
Molochnaya Promyshlennost' No. 3, 12-14 (1971) [Ru] [Belorusskii Filial Vses. Nauchno-issled, Inst. Molochnoi Promyshlennosti, USSR]

Research projects carried out at the Institute during approx. 1966-1970 included: working-out of directives for manufacture of butter of improved consistency, and retail butter packaging; vacuum deodorizers for cream for butter manufacture; development of methods for the manufacture of Rossiisskii cheese of high quality; study and selection of local strains of lactic acid bacteria for cheese starters; study of cultures containing highly proteolytic bacteria for cheese manufacture; technology and equipment for various products (from skim-milk, buttermilk and whey), e.g. coprecipitates for use in sausages; casein manufacture; effect of feeding lupin on technological characteristics of the milk and quality of milk products; method for the estimation of proteolytic activity of lactic acid bacteria; methods of incorporating crystalline carotene into butter made by phase inversion of high-fat cream; and study of sulphydryl compounds with reference to their effects on quality and storage life of butter. FL

8 P 1138
Isolation and identification of stimulatory substance involved in the associative growth of cheese cultures.
Kothari, S. L.; Nambudripad, V. K. N.
Journal of Dairy Science 56 (4) 423-428 (1973) [32 ref. En] [Div. of Dairy Microbiol., Nat. Dairy Res. Inst., Karnal, Haryana, India]

The stimulatory material produced in milk by 2 strains of Streptococcus cremoris (KH and HC) which enhanced the rate of acid production by Str. cremoris R_6 in milk [see FSTA (1972) 4 3P396] has been identified as guanine by ultaviolet spectral analysis and other properties. Pure preparations of purine like adenine, guanine and guanosine behaved similarly and enhanced acid production and proteolysis in milk by Str. cremoris R_6. AS

8 P 1152
[Proteolytic activity of lactic acid bacteria in joint culturing in milk with yeasts and Penicillium roqueforti.]
Borisova, G. V.; Kriventsova, V. F.
Trudy, Vologodskii Molochnyi Institut No. 64, 3-7 (1972) [12 ref. Ru] [Vologodskii Molochyni Inst., Vologda, USSR]

2 strains of Lactobacillus bifidus, 1 of L. acidophilus, 1 of Streptococcus lactis, 1 of Str. cremoris, and 2 of Str. diacetilactis were grown in sterilized milk singly and in various combinations, both with and without P. roqueforti and with and

were investigated, proteolytic activity being measured by determination of liberated amino acids. It is concluded from tabulated results that presence of P. roqueforti enhanced the proteolytic activity of the lactic acid bacteria, the effect being further enhanced when yeast was also present. SKK

9 P 1381

Effect of citric acid on acid and flavour production by lactic acid bacteria.

Dutta, S. M.; Kuila, R. K.; Sabharwal, V. B.; Ranganathan, B.

Journal of Food Science and Technology, India **9** (4) 207-209 (1972) [17 ref. En] [Nat. Dairy Res. Inst., Karnal]

Streptococcus lactis C10, Str. cremoris C1, Str. diacetilactis DRC1, Str. thermophilus HST, Lactobacillus bulgaricus LBW, L. casei L8, L. helveticus L23 and L. plantarum L24 were each grown in reconstituted dried skim-milk containing 0, 0.1, 0.25 and 5% added citric acid, all at pH 6.8. Cultures of the 1st 3 named organisms were incubated at 30°C and the rest at 37°C for 18 h. With increasing citrate concn., titratable acidity of Str. cremoris and L. bulgaricus cultures tended to decrease. Proteolytic activity of all the lactobacilli increased with increasing citrate. Production of acetoin, diacetyl and volatile acids by Str. diacetilactis [volatile acids being determined by the method of Hemphenius & Liska, Journal of Dairy Science (1968) **51** (2) 221-222, but with titration against 0.01N instead of 0.1N NaOH] increased markedly as citrate concn. increased, whereas diacetyl production by Str. thermophilus showed little change and volatile acids tended to decrease. Volatile acid production of L. plantarum increased slgithly, and that of L. casei and L. bulgaricus decreased with increasing citrate; that of L. helveticus increased, but to the greatest extent with 0.1% citrate. CDP

9 P 1384

The enzymic degradation of bitter peptides by starter streptococci.

Sullivan, J. J.; Mou, L.; Rood, J. I.; Jago, G. R.

Australian Journal of Dairy Technology **28** (1) 20-26 (1973) [29 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne Parkville]

The following aspects are reviewed: bitter peptides as substrates for peptidase activity; hydrolysis of bitter peptide extracts and of synthetic substrates by bitter and non-bitter starter streptococci; and separation of peptidase activities on Sephadex G-200. It is concluded that bitterness control in cheese is essentially the control of total proteinase activity; this may be achieved in practice by a combination of methods including limitation of starter population by regulation of cooking temp., selection of starters with low proteinase activity on β-casein, maintenance of high salt-in-water levels, and avoidance of the use of excess rennet. CDP

9 P 1412

[Method of transferring Streptococcus thermophilus in the cheese industry, and a new method for the preparation of starters.]

Sozzi, T.

Latte **47** (1) 15-19 (1973) [23 ref. It, en] [Istituto di Microbiologia Agraria e Tecnica dell'Univ. di Bologna, Italy]

Str. thermophilus may lose its fermentative activity if repeatedly transferred in sterile milk unless this is supplemented by addition of small amounts of yeast extract. By adding 1% yeast extract to the milk and stopping the incubation upon coagulation (approx. 3 h at 40°C), the fermentative activity could be maintained almost indefinitely. Starters ('latto-innesti') derived from pure strains of Str. thermophilus can conveniently be prepared by inoculation at 42°C into a 10% solution of reconstituted antibiotic-free dried skim-milk enriched with 0.5% yeast extract. These methods of preparation have proved their value in many years of use in the manufacture of Italian soft cheese. GTP

10 P 1483

Casein as a necessary factor in the production of stimulatory material for associative growth of lactic streptococci.

Kothari, S. L.; Nambudripad, V. K. N.

Applied Microbiology **25** (2) 212-215 (1973) [16 ref. En] [Dairy Microbiol. Div., Nat. Dairy Res. Inst., Karnal, Haryana, India]

Strains of Streptococcus cremoris KH and HC produced material that was stimulatory for Str. cremoris R_6 in milk and in the dialysable fraction of milk, but not in the disalysate fraction of milk, in lactic acid whey or in lactose broth. The addition of casein to these latter media permitted the production of this stimulatory material to occur. Tryptone, peptone and yeast extract could not be substituted for casein in producing the stimulatory material or in initiating associative growth in the lactic acid whey. The min. concn. of casein required appeared to be 2.0-2.5%. [See also FSTA **5** (1973) 8P1138.] AS

10 P 1511

Hydrogen peroxide formation and hydrogen peroxide splitting activity in lactic acid bacteria.

Premi, L.; Bottazzi, V.

Milchwissenschaft **27** (12) 762-765 (1972) [18 ref. En, de] [Dept. of Dairy Res., Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

In investigations involving strains of lactic acid bacteria freshly isolated from natural whey starter, and culture collection strains, Lactobacillus helveticus, L. lactis, L. jugurt and L. bulgaricus strains formed H_2O_2 during storage at 5°C, L. lactis producing the highest levels (9.2-14.0 μg/ml after 1 day). L. casei, Streptococcus lactis, Str. diacetilactis and Str. thermop[illegible] did not produce [illegible]

splitting activity was demonstrated in L. casei, Str. lactis and Str. diacetilactis, and it is suggested that these 3 species possess a double enzymic system involving both NADH oxidase and NADH peroxidase. CDP

10 P 1544
Activation of nisin production by UV-irradition in a nisin-producing strain of Streptococcus lactis.
Kalra, M. S.; Kuila, R. K.; Ranganathan, B.
Experientia 29 (5) 624-625 (1973) [9 ref. En, de] [Nat. Dairy Res. Inst., Dairy Bacteriology Div., Karnal, India]

A survival curve was prepared of 6 h broth cultures of Str. lactis-6, washed and suspended in phosphate buffer (0.02M, pH 7), and exposed to UV irradiation of 0-10 800 ergs/mm^2. A dose of 9000 ergs/mm^2 gave <1% survival when subsequently plated on yeast dextrose agar and high nisin-producing mutants were isolated. For determination of nisin production, isolates were grown in yeast dextrose broth for 16 h at 30°C and nisin was determined by the method of Tramer & Fowler [J. Sci. Fd. Agric. (1964) 15 (8) 522-528]. An increase in nisin production of 50 and 100% was evident after the 1st and 2nd UV irradiation treatments, after the 3rd treatment a downward trend was found, although the range in nisin production was greater than in the non-irradiated parent culture. The 1st and 2nd exposures to UV irradiation had no effect on acid production of the cultures, but the 3rd reduced it. Survival of Str. lactis was greater after the 3rd than after the 1st 2 exposures (5.2 vs. 0.17 and 0.26%). DMK

10 P 1545
[Interaction of mesophilic and thermophilic lactic acid bacteria and its practical significance.]
[Review]
Rymaszewski, J.; Poznanski, S.; Kornacki, K.; Pruszewicz, L.
Przeglad Mleczarski 22 (6) suppl. Kwartalny Dodatek Naukowy 2, 7-9 (1973) [16 ref. Pl] [Inst. Inzynierii i Biotech. Zywnosci ART i Olsztynie, Poland]

11 P 1583
A case study: syneresis of cold-pack cheese food related to growth of lactic acid bacteria.
Duitschaever, C. L.; Irvine, D. M.
Journal of Milk and Food Technology 36 (4) 196-199 (1973) [7 ref. En] [Dept. of Food Sci., Univ. of Guelph, Ontario, Canada]

In 1971, many packages of Cold-Pack Cheese Food (CPCF) were returned to the manufacturers [illegible] of free liquid in the packages. Samples of experimental CPCF were prepared by blending Cheddar cheese, butter, sorbic acid, dried whey, dried skim-milk and water without heat treatment, and packaged in cryovac pouches which were evacuated and heat-sealed. The packages were stored at 5, 10, 15 and 20°C, and changes in pH, microbial flora and degree of syneresis were measured over a period of 42 days. The pH of the CPCF fell from an initial value of 5.05 to 4.60, 4.67 and 4.78 at 20, 15 and 10°C respectively. There was no change in the pH of CPCF stored at 5°C. The amount of exudate also increased with increasing storage temp. The predominant microorganisms present were lactobacilli and streptococci, and their numbers increased with increasing storage temp. Staphylococci counts were low in all samples and did not increase at any of the storage temp.; coliforms were not detected. It is concluded that the lactobacilli and streptococci utilized the lactose in the dried whey and skim-milk, with a resultant production of lactic acid and fall in pH to the iso-electric point of the casein, causing the exudate to appear in the packages. The problem is overcome by using high quality ingredients and keeping the temp. at or below 5°C during processing and storage. MEG

11 P 1672
Continuous production of yoghurt cultures and stimulation of Lactobacillus bulgaricus by formic acid.
Bottazzi, V.; Battistotti, B.; Vescovo, M.
Annali della Facolta di Agraria, Universita Cattolica del Sacro Cuore, Milano 11 (1/3) 429-441 (1971) [13 ref. En, fr, it]
See FSTA (1973) 3 10P1750.

11 P 1681
[Citrate-fermenting lactobacilli in milk for Grana cheese.]
Bottazzi, V.; Battistotti, B.
Annali della Facolta di Agraria, Universita Cattolica del Sacro Cuore, Milano 11 (1/3) 443-456 (1971) [14 ref. It, fr, en]
See FSTA (1972) 4 10P1625.

12 P 1791
[Studies on lactose-fermenting yeasts. IX. Quantitative determination of volatile fatty acid in alcohol fermented milk.]
Nakanishi, T.; Arai, I.
Japanese Journal of Dairy Science [Rakuno Kagaku no Kenkyu] 22 (2) A60-A64 (1973) [11 ref. Ja, en] [Fac. of Agric., Tohoku Univ., Sendai]
Quantitative determination of volatile fatty acid in alcohol fermented milk was studied. Two methods were compared, one by steam distillation and titration, and the other by gas chromatography. The latter method was found to be more accurate and convenient than the former. Gas chromatographic conditions were as follows: column, 3 mm x 2 m glass column packed with 10% Silicone DC 550 on Chromosorb W (AW-DMCS); column temp., 150°C; carrier gas, N$_2$ 50 ml/min; detector, FID; sample size, 1 µl. Volatile fatty acid in alcohol fermented milk was found to be mainly acetic acid. Propionic acid was also detected in small amounts. Butyric acid was not detected. Volatile fatty acid in alcohol fermented milk increased with the increase of alcohol content in the milk. Volatile fatty acid in alcohol fermented milk was found to be 0.1-0.2 mg/ml when the alcohol content was 1%, and 0.3-0.4 mg/ml when the alcohol content was 2%. Volatile fatty acid in alcohol fermented milk increased with the increase of storage time. Volatile fatty acid in alcohol fermented milk was found to be 0.2-0.3 mg/ml after 1 day storage at 5°C, and 0.4-0.5 mg/ml after 3 days storage at 5°C. Volatile fatty acid in alcohol fermented milk increased with the increase of storage temperature. Volatile fatty acid in alcohol fermented milk was found to be 0.2-0.3 mg/ml after 1 day storage at 5°C, and 0.5-0.6 mg/ml after 1 day storage at 30°C. Volatile fatty acid in alcohol fermented milk increased with the increase of storage time and storage temperature. Volatile fatty acid in alcohol fermented milk was found to be 0.2-0.3 mg/ml after 1 day storage at 5°C, and 0.4-0.5 mg/ml after 3 days storage at 5°C. Volatile fatty acid in alcohol fermented milk increased with the increase of storage temperature. Volatile fatty acid in alcohol fermented milk was found to be 0.2-0.3 mg/ml after 1 day storage at 5°C, and 0.5-0.6 mg/ml after 1 day storage at 30°C. Volatile fatty acid in alcohol fermented milk increased with the increase of storage time and storage temperature.

were used individually and in yeast/lactic acid bacteri combinations to ferment milk; volatile fatty acids (VFA) in the fermented product after 8-10 days at 30°C were determined by GLC. Total VFA production by the individual organisms was [mg/100 ml]: C. pseudotropicalis, 196.74; T. sphaerica, 249.77; Str. lactis, 114.98; and L. bulgaricus, 146.22. In combined culture with lactic acid bacteria, cultures of C. pseudotropicalis had higher total VFA contents and cultures of T. sphaerica had lower VFA contents than when cultured alone. Tabulated data of the VFA produced in each fermented milk show that acetic acid was the major VFA in all cases; other VFA produced by the yeasts alone and in combination with lactic acid bacteria were C_4, C_5, C_6, C_8 and C_{10} fatty acids. 2 unidentified peaks appeared on the chromatograms, one (X_1) before n-caprylic and the other (X_2) after n-capric acid. Only X_1 was found in milk prior to fermentation; X_1 was not found in milk fermented with T. sphaerica or with C. pseudotropicalis + Str. lactis, whereas X_2 was found in all the fermented milks. [From En summ.] [See FSTA (1973) **5** 9B82 for part VIII.] CDP

12 P 1843

[Freeze-drying of commercial strains of lactic acid bacteria.]

Lagoda, I. V.; Bannikova, L. A.

Molochnaya Promyshlennost' No. 3, 4-7 (1973) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Preliminary eperiments on freeze-drying of commerical strains of lactic acid bacteria showed that a final moisture content of ≤1% was essential to ensure satisfactory storage stability. The procedure finally chosen for freeze-drying 5 strains each of Streptococcus lactis, Str. cremoris, Str. acetoinicus, Str. diacetilactis, Str. thermophilus, Lactobacillus acidophilus and L. bulgaricus was as follows: 18-h skim-milk (16% TS) cultures were added at 30% to a protective sucrose/buffer/gelatin/sodium glutamate solution [see FSTA (1970) **2** 7P934], the mixture was frozen at -40°C, and freeze-dried at 0.1-0.001 mm Hg, with initial temp. of -23° to -25°C, final temp. 32-35°C, and duration of cycle 40-42 h (including 8-10 h final drying at 32-35°C). Survival on freeze-drying ranged from 80% for L. bulgaricus to 96% for Str. acetoinicus, and survival on storage under reduced pressure at -18°C for 1 yr ranged from 76% for Str. diacetilactis to 89% for Str. thermophilus; when stored at 4-6°C, stability ranged from 61 to 71%. The characteristic properties of the strains were not altered by freeze-drying, and some increases in acid formation and proteolytic activity, and in formation of diacetyl and acetoin by heterofermentative strains were noticed. SKK

7 H 1045

[Effect of some amino acids and vitamins on growth and biochemical activity of lactic acid bacteria of wine.]

Bambalov, G.

Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost **18** (1) 127-135 (1971) [9 ref. Bg, ru, fr] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]

A basal medium of (g/l.) glucose 2, fructose 2, KH_2PO_4 1.5 $MgSO_4.7H_2O$ 0.2, $MnSO_4.4H_2O$ 0.01, $FeCl_3$ 0.002 and NaCl 0.01 was supplemented with a mixture of 19 amino acids and/or 10 vitamins and thymine or with the 2 mixtures together but leaving out in turn a different amino acid or vitamin each time. 12 strains of lactic acid bacteria consisting of Lactobacillus plantarum, L. buchneri, 6 strains of heterofermentative rods (R) and 4 strains of homofermentative cocci (C) isolated from Bulgarian wines that had undergone malo-lactic fermentation were cultured in the different variants of the medium. The results are tabulated. Aspartic and glutamic acids, leucine, phenylalanine and threonine proved essential for C and methionine prove essential for R. Both R and C differed in their amino acid and vitamin requirements from the 2 lactobacilli. SKK

8 M 1098

Cytological and deoxyribonucleic acid-deoxyribonucleic acid hybridization studies on Lactobacillus isolates from San Francisco sourdough.

Sriranganathan, N.; Seidler, R. J.; Sandine, W. E.; Elliker, P. R.

Applied Microbiology **25** (3) 461-470 (1973) [38 ref. En] [Dept. of Microbiol., Oregon St. Univ., Corvallis, 97331, USA]

9 B 80

The use of scanning electron microscopy to show confluent growth of a Saccharomyces and a Leuconostoc species.

Passmore, S. M.; Haggett, B.

Journal of Applied Bacteriology **36** (1) 89-92 (1973) [11 ref. En] [Long Ashton Res. Sta., Univ. of Bristol, UK]

An in vitro association between cells of Saccharomyces cerevisiae and a Leuconostoc sp. has been demonstrated using the scanning electron microscope. These organisms are often naturally associated in fruit products and fermenting beverages such as apple juice and cider. AS

9 G 472
Abstracts of the 5th annual meeting, Basel 18-19 May 1973. [Conference proceedings] Switzerland, Union of Swiss Societies for Experimental Biology
Experientia **29** (6) 739-780 (1973) [En & Fr] [Basel, Switzerland]

Abstracts given include: Adherence of enteropathogenic E. coli to intestinal cells: effect of hyperimmune lactoserum, by G. Demierre, D. Rivier & R. Zinkernagel (p. 751, En); Optimalization of conditions for preparing cytoplasmic, enzymically active material from lactobacilli and lactic streptococci, by R. Maret & J. Rehacek (p. 754, Fr, 1 ref.); and Physical and chemical characterization of wheat germ agglutinin, by Y. Nagata & M. M. Burger (p. 755, En). HBr

9 H 1384
[Use of a CO_2-electrode for determining the activity of "malic enzyme" of lactic acid bacteria in wine.]
Lonvaud, M.; Ribereau-Gayon, P.
Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences, D **276** (15) 2329-2331 (1973) [15 ref. Fr] [Inst. d'OEnologie, Univ. of Bordeaux-II, 351, cours de la Liberation, 33405 Talence, France]

The "malic enzyme" of wine lactic acid bacteria transforms L(-)-malate to L(+)-lactate. A method is described for measuring this enzyme by the CO_2 produced when 0.1-0.5 ml of a cell-free extract of the bacteria is mixed with 0.2 ml of 0.05 M malic acid (neutralized to pH 6.0 with N NaOH), 0.2 ml of 0.05 M NAD^+, 0.3 ml of 0.02 M $MnCl_2$ and 1 ml of 0.2 M phosphate buffer of pH 6.0. The CO_2 is measured by means of an electrode. In preliminary experiments, the amounts of CO_2 produced were shown to be in agreement with the amounts of malate used and of lactate formed. Some values for "malic enzyme" in wine bacteria (Lactobacillus plantarum, L. casei, L. hilgardii, L. fructivorans, L. brevis, Pediococcus cerevisiae, Leuconostoc oinos and Leuc. gracile) are given. MEG

10 S 1145
[A study of the production of aromatic substances by the lactic acid bacteria Pediococcus cerevisiae and Lactobacillus plantarum during their combined cultivation in the manufacture of cooked sausage.]
Gonotskii, V. A.; Palmin, V. V.
Prikladnaya Biokhimiya i Mikrobiologiya **9** (3) 362-369 (1973) [19 ref. Ru, en] [Moscow Tech. Inst. of Meat & Milk Ind., USSR]

Formation of aromatic substances during combined cultivation of P. cerevisiae and L. plantarum on blood serum and a mixture of serum and skim-milk at 28°C was investigated. The fermentation process was controlled, and lactose consumption, pH, lactic acid production and the number of viable microbial cells were measured. Carboxylic compounds were assayed with respect to the quantity of 2,4-dinitrophenylhydrazine involved in the reaction and to their reaction with thiobarbituric acid. Individual neutral carboxylic compounds were separated by TLC and acid compounds (ketoacids) were separated by paper chromatography. Data characterizing peculiar features in the production of aromatic substances by the bacteria are presented. The period of max. accumulation of volatile carboxyllic compounds (72 h) coincides with the development of the strongest aroma in the starters. AS

10 S 1214
[Lactic acid bacteria in sausages.]
Aubert, S. d'; Cantoni, C. A.
Archivio Veterinario Italiano **24** (1/2) 57-62 (1973) [5 ref. It, en, fr, de] [Istituto di Ispezione degli Alimenti di Origine Animale, Univ., Milan, Italy]

The types and amounts of lactobacilli in (i) Milan and (ii) Varzi types of salami during maturation have been investigated. Of the types found in (i) 44% was L. farciminis, 24% was L. alimentarius and 42% was non-classifiable lactobacilli. Of the types found in (ii) 75% was L. farciminis, 9% was L. alimentarius and 16% was non-classifiable lactobacilli. Samples of (i) and (ii) with or without the addition of 4% milk powder were matured for 60 days and the number of lactobacilli and the pH of the salami estimated after 0, 7, 15, 30, 45 and 60 days. In (i) without milk powder the pH changed from 5.4 to 5.2 and the number of lactobacilli from <500 to 250×10^6; the number of tetracycline-resistant lactobacilli increased from <500 to 7×10^6. In (ii) the pH changed from 5.5 to 6.1 and the number of lactobacilli from <500 to 250×10^6; the number of tetracycline-resistant lactobacilli increased from <500 to 90×10^6. Corresponding figures for salami with 4% milk powder added were for (i) pH 5.4 to 5.2, from <500 to 175×10^6 and from <500 to 6×10^5; and for (ii) pH 5.5 to 6.0, from <500 to 190×10^6 and from <500 to 2.5×10 These results show that the number of lactobacilli increases progressively during maturation, especially after the 30 day mark, most lactobacilli being L. farciminis. LA

11 J 1802
[Method of fermenting cabbage.]
Erokhina, M. V.; Panfilov, N. V.; Dokuchaev, N. G.; Voronin, G. A.; Lapenis, A. A. (**USSR**, Moskovskii Ordena Trudovogo Krasnogo Znameni Institut Narodnogo Khozyaistva im. G.V. Plekhanova)
USSR Patent 376 078 (1973) [Ru]

Net bags are placed over plastics liners, and these are placed in a tank and filled with cabbage and the required additives. The contents are compressed under vacuum, and the bag necks tied to ensure that a level of brine remains above the cabbage during subsequent fermentation and storage. Correct fermentation is preferably ensured by adding a pure culture of Lactobacillus plantarum strain 1a to the cabbage during the filling operation, in an amount of up to 2% of the weight of starting materials, followed by fermentation at 22-24°C for 3-4 days, and storage at 0±2°C. W&Co

12 T 599
[Induction of premature lysis of phage-infected Lactobacillus casei by alkyl esters of p-hydroxybenzoic acid.]
Murata, A.; Shiroura, Y.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **47** (1) 65-72 (1973) [21 ref. Ja, en] [Lab. of Applied Microbiol., Dept. of Agric. Chem., Univ., Saga 840]

12 T 600
[Induction of premature lysis of phage-infected Lactobacillus casei by food preservatives.]
Murata, A.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **47** (3) 217-222 (1973) [5 ref. Ja, en]

12 T 601
[Effect of food preservatives on Lactobacillus casei and its phage J 1.]
Murata, A.; Ikeda, M.; Mitsutake, T.; Soeda, E.; Saruno, R.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **47** (4) 267-274 (1973) [21 ref. Ja, en]

12 T 616
[Studies on brewing of shoyu mash. II. Antigen analysis of Pediococcus halophilus isolated from shoyu mash.]
Nakamura, K.; Nakamura, Y.; Ogimoto, K.; Sudo, T.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **42** (9) 536-543 (1968) [7 ref. Ja, en]
See Journal of the Agricultural Chemical Society of Japan (1968) **42** (3) 152-157 for part I.

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H. BROOKES

ASSISTANT EDITO

1

[Effect of γ-irradiation on metabolic activities of food microorganisms. I. Yeasts and lactic acid bacteria.]
Sasaki, Y.; Takao, S.; Iijima, T.
Journal of Fermentation Technology [Hakko Kogaku Zasshi] **47** (2) 97-101 (1969) [24 ref. Ja, en] [Lab. of Applied Microbiol., Fac. of Agric., Hokkaido Univ., Sapporo, Japan]

Enzymic systems of alcoholic fermentation in Saccharomyces cerevisiae and its subsp. ellipsoideus, Sacc. sake and Candida albicans, and lactic acid fermenting systems in Lactobacillus bulgaricus, L. plantarum, Streptococcus lactis and Leuconostoc mesenteroides were much more resistant to radiation than were the organisms containing them. Skim-milk had a highly protective effect against radiation damage both to the organisms and to their fermentative or lactic acid producing activities. [From En summ.] CDP

2

[Determination of bacterial contaminants of beer in Nakagawa's modified medium.
Savel, J.
Kvasny Prumysl **19** (4) 76-78; (5) 101-104 (1973) [33 ref. Cs, ru, en, de] [Jihoceske Pivovary, n.p., Ceske Budejovice, Czechoslovakia]

The preparation of a simple, semi-solid modified medium according to Nakagawa for determination of lactic acid bacteria in beer and brewery products is described. Sevac, an enzymic casein hydrolysate, was used for the substrate. Cultivation is at 26-28°C, and readings are taken every 4 days. The method can be applied for the normal control of fermenting young beer, brewers' yeast and the end product. STI

3

Induction of red color formation in cabbage juice by Lactobacillus brevis and its relationship to pink sauerkraut.
Stamer, J. R.; Hrazdina, G.; Stoyla, B. O.
Applied Microbiology **26** (2) 161-166 (1973) [11 ref. En] [Dept. of Food Sci. and Tech., New York St. Agric. Expt. Sta., Cornell Univ., Geneva, 14456, USA]

Membrane-filtered cabbage juice, when fermented by Lactobacillus brevis under conditions of controlled pH, frequently produced a water-soluble red pigment. The pigment, presumably responsible for imparting a highly objectionable discoloration to sauerkraut, was formed during the post logarithmic phase of growth. Colour development is pH dependent (5.2 to 6.3) and can be suppressed by chemical reducing agents or anaerobic conditions of growth. The compound responsible for discoloration was purified and partially characterized. AS

4

[Studies on canned bamboo shoots. III. Increase of microorganisms in bamboo shoots during soaking in water.]
Mori, D.; Ikegami, Y.; Sawayama, Z.
Canners' Journal [Kanzume Jiho] **52** (4) 339-341 (1973) [5 ref. Ja, en] [Toyo Inst. of Food Tech., Kawanishi-shi, Hyogo, Japan]

Microorganisms in bamboo shoots soaked in water were identified as Leuconostoc mesenteroides and Streptococcus lactis. These 2 microorganisms formed lactic, acetic, propionic, fumaric, succinic and pyroflutamic acids from glucose. Optimum temp. for growth of L. mesenteroides and S. lactis is 30-33°C and 35°C, respectively. YY

5

[Acid production by caries-linked streptococci from sugars and sugar alcohols, with particular reference to isomaltite and isomaltulose.] Über die Säurebildung kariesätiologisch wichtiger Streptokokken aus Zuckern und Zuckeralkoholen unter besonderer Berücksichtigung von Isomaltit und Isomaltulose.
Gehring, F.
Zeitschrift für Ernährungswissenschaft Suppl. 15, 16-27 (1973) [19 ref. De] [Expt. Abteilung der Universitätsklinik & Poliklinik für Zahn-, Mund- und Kieferkrankheiten, Würzburg, Federal Republic of Germany]

6

[Meeting on technical and scientific aspects of modern cheesemaking.]
Anon.
Scienza e Tecnica Lattiero-Casearia **24** (3) 109-165 (1973) [It, Fr]

Papers presented at this meeting held in Milan on 4 May 1973 included the following: A summary of French developments in cheesemaking, by M. Pien (pp. 109-115, Fr); Metabolic variations in lactic acid bacteria in soft cheesemaking, by V. Bottazi (pp. 119-135, It, a review with 56 ref.); Developments in cheesemaking, particularly Italian and Crescenza cheese, by R. Invernizzi (pp. 136-143, It); Problems of Taleggio cheese, by G. C. Emaldi (pp. 144-151, It); Technological considerations that can prevent some defects in Gorgonzola cheese, by C. Ghitti (pp. 152-160, It); and Rational use of starters in soft cheesemaking, by B. B. Salvadori (pp. 161-165, It). JMD

7

[Frozen storage of concentrated suspensions of lactic acid bacteria for use in the dairy industry.]
Accolas, J. P.; Auclair, J.
Proceedings of the International Congress of Refrigeration (13th Washington) **3**, 971-974 (1971, publ. 1973) [6 ref. Fr, en] [Inst. Nat. de la Recherche Agronomique, Jouy-en-Josas, France]

Conc. suspensions of lactic acid bacteria containing 5×10^{10}-5×10^{11} organisms/g stable at -30°C for 12 months when glycerol was present in the medium. With more dilute suspensions it was necessary to freeze the cultures in a milk medium (without glycerol) at lower temp. e.g. in liquid N_2. Bacterial cells harvested at the beginning of the stationary phase of growth were most satisfactory. Suspensions of streptococci were more resistant to freezing and thawing than were suspensions of lactobacilli. MEG

8

[Preparation of culturing medium for lactic bacteria.]
Takahashi, T.; Taniyama, R.
Japanese Patent 41038/72 (1972) [Ja]

The protein content of whole or skim-milk is enriched up to 48% of the TS by adding a solution of refined and deodorized edible casein, sodium caseinate etc., and/or the buffer action of milk is enhanced by adding phosphates, alkali salts of organic acids etc. at >3% of TS. The fortified milk is pasteurized or sterilized, after which it is concentrated or dehydrated if necessary. Final product, reconstituted if necessary, shows no coagulation of protein during pasteurization or sterilization, and it also shows rapid acid formation during lactic fermentation. [From En summ.] JMD

9

Use of lactic cultures for improving shelf life of ground meat.
Olson, H. C.; Reddy, G. S.; Henrickson, R. L.
Cultured Dairy Products Journal **6** (2) 8-10 (1971) [20 ref. En] [Dept. of Animal Sci. and Ind., Oklahoma St. Univ., Stillwater, USA]

The effects of added lactic cultures (Streptococcus lactis + Leuconostoc citrovorum) on the keeping quality of ground beef were investigated. Freshly-ground beef was divided into three 5-lb lots: (i) beef + 10% (by wt.) lactic culture; (ii) as (i), but with 450 ppm ascorbic acid: and (iii) beef without additions (control sample). All samples were packaged in polyethylene bags and stored at 45°F for 0, 3, 5 and 7 days, after which they were analysed, and tested organoleptically and microbiologically. Addition of lactic cultures markedly inhibited growth of Gram-negative bacteria: the crystal violet-triphenyl tetrazolium chloride agar count in (iii) increased 1000-fold during storage for 7 days, while the count in (ii) or (i) increased only 5-fold. In (iii) the pH rose from 5.65 to 5.75 during storage; in (i) and (ii), The pH declined rapidly for the first 3 days, then declined more slowly (to pH 4.75-4.78) during the following 4 days. Volatile N formation was much slower in cultured meats then in (iii). Flavour and odour scores varied widely, but added lactic cultures appeared to delay development of undesirable flavours and odours. (ii) developed a grey discoloration during storage; colour retention was greatly enhanced by addition of ascorbic acid. AJDW

10

[Studies on the analysis of brewing process of shoyu mash. IV. Isolation and preservation of Pediococcus halophilus under purified CO_2.]
Nakamura, K.; Nakamura, Y.; Azuma, R.; Sudo, T.; Umeda, I.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **44** (3) 103-106 (1970) [10 ref. Ja, en] [Japan Shoyu Res. Inst.]

Isolation and counting of P. halophilus in shoyu mash have usually been performed by tube or plate culture. The culture medium contains sodium thioglycolate, eurocidin and NaCl. An anaerobic tube method was applied for isolation and counting P. halophilus and gave good results, while growth of coexisting bacilli and yeast was inhibited without sodium thioglycolate and eurocidin. The survival of P. halophilus in stock culture by this method was 12 months without transfer (by the usual method it was 2 months). It is proposed that this method be recommended for the isolation, counting and preservation of P. halophilus. AS

11

Properties of antimicrobial substances with S. diacetilactis and L. citrovorum.
Genske, R. P.; Branen, A. L.
Modern Dairy **52** (7/8) 12-14 (1973) [21 ref. En]

The inhibitory activities of Streptococcus diacetilactis and Leuconostoc citrovorum towards other microorganisms are reviewed; inhibition is due to the production of organic acids, H_2O_2, and other unidentified compounds. The possibility is discussed of separating these unidentified inhibitory compounds from the bacterial cells and using the cell-free product to prevent food spoilage; this would have advantages over adding the intact microbial cells to the food in that potential production of off-flavours and texture changes due to growth of the cells would be eliminated. CDP

12

Cellular fatty acid spectra of hiochi bacteria, alcohol-tolerant lactobacilli, and their group separation.

Uchida, K.; Mogi, K.

Journal of General and Applied Microbiology **19** (3) 233-249 (1973) [25 ref. En] [Central Res. Lab., Kikkoman Shoyu Co. Ltd., Noda-shi, Chiba-ken 278, Japan]

38 strains of hiochi bacteria, ethanol-tolerant sake-spoilage lactobacilli, were analysed for their cellular fatty acid spectra with special reference to their classification. They were separated, with respect to their fatty acid spectra, into 3 groups, which corresponded respectively to the homo-fermentor, and mevalonic acid-dependent and -independent hetero-fermentors. Long straight-chain saturated and mono-unsaturated fatty acids with 20-26 carbon atoms were found, in addition to fatty acids ordinarily known in typical lactobacilli, exclusively in the mevalonic acid-dependent hetero-fermentative group (L. heterohiochii), the most predominant sake-spoilage microorganism. Uniqueness of the synthetic pathways for fatty acids was pointed out, and the feasibility of detecting or characterizing rapidly the spoilage bacteria in hiochi-infected sake through the fatty acid analysis of the sedimented cells was discussed. AS

13

Lipase activity of Lactobacillus brevis.

Chander, H.; Chebbi, N. B.; Ranganathan, B.

Archiv für Mikrobiologie **92** (2) 171-174 (1973) [20 ref. En] [Nat. Dairy Res. Inst., Karnal, Haryana, India]

The intracellular lipase from a strain of Lactobacillus brevis [isolated from cheese] was partially purified and its properties were studied. Of the simple triglycerides, tripropionin was hydrolysed most readily by the enzyme as compared to others such as tributyrin, tricaproin and tricaprylin. Of the natural triglycerides such as butter oil and coconut oil, the former was degraded more readily than the latter. Among unsaturated triglycerides, the enzyme preferentially hydrolysed triolein as compared to olive oil. Highest enzymic activity was observed at 30° after 3.5 h incubation at pH 6.5. Salts of Mn, Mg, Na and Ca stimulated lipase activity while those of Ag, Hg and Zn were inhibitory. The enzyme was completely inactivated at 62.8°C after 30 min and at 71.7°C after 16 s. AS

14

[Aminogram of nisin-producing Streptococcus lactis.]

Egorov, N. S.; Baranova, I. P.; Sil'vestrova, O. I.

Mikrobiologiya **41** (5) 805-807 (1972) [5 ref. Ru, en] [Katedra Mikrobiologii, Biologo-Pochvennyi Fak., Gosudarstvennyi Univ., Moscow, USSR]

The amino acid requirements of the nisin-producing variant of Str. lactis MGU were defined as follows: alanine, valine, leucine and glutamic acid are essential; growth is stimulated by lysine and arginine and, to a lesser extent, by methionine and isoleucine; other amino acids are without effect on growth. The requirements of the MGU variant not producing nisin were similar. SKK

15

[Proteolytic activity of lactic fermentation streptococci.]

Akopyan, L. G.; Sarakhanyan, F. G.

Biologicheskii Zhurnal Armenii **25** (8) 27-31 (1972) [16 ref. Ru]

Proteolytic activity was investigated in strains of Streptococcus lactis, Str. thermophilus and Str. diacetilactis, resistant and non-resistant to high concn. of phenol, and relationships between the acid-forming capacity and proteolytic activity were determined. 97 strains from epiphytic microflora of plants and from milk products were studied. Differences in proteolytic activity existed between lactic streptococci from the 2 sources, Str. lactis and Str. thermophilus from milk products being more active than strains from plants whilst the reverse was true for Str. diacetilactis. Strains resistant to high concn. of phenol possessed higher proteolytic activity than the non-resistant strains. No correlation was found between acid-forming capacity and proteolytic activity in the strains studied. STI

16

Agar medium for differentiation of Streptococcus cremoris from other bacteria.

Thomas, T. D.

New Zealand Journal of Dairy Science and Technology **8** (2) 70-71 (1973) [2 ref. En] [New Zealand Dairy Res. Inst., Palmerston North]

This medium is based on medium M16 of Lowrie & Pearce [FSTA (1972) **4** 7P1104] and the differential agar of Reddy et al. [Applied Microbiology (1969) **18** (5) 755-759], but unlike the latter which contains milk and $CaCO_3$, making it opaque, the carbohydrate source in modified M16 medium is lactose. Samples are surface plated using a bent glass rod or plated using a soft agar overlay, and incubated for 24-48 h at 30° in air or CO_2-enriched air. Streptococcus cremoris ferments lactose to lactic acid which changes the colour of the indicator, whereas Str. lactis also metabolizes arginine in the medium, and the NH_3 thus produced neutralizes lactic acid from lactose fermentation and there is no colour change. In comparison with the medium of Reddy et al., modified M16 is easier to prepare, and, being transparent, is easier for colony counting. CDP

17

[Automation of continuous cultivation of lactic acid bacteria during milk fermentation.]
Brusilovskii, L. P.; Svirinovskii, V. P.
Molochnaya Promyshlennost' No. 6, 17-19 (1973) [9 ref. Ru] [Vses. Nauchno-issled. Inst. Moloch. Prom., USSR]

A single-stage fermenter in the form of a vertical jacketed tank for continuous cultivation of microorganisms in milk is briefly described. Static and dynamic characteristics of the fermenter were determined mathematically. Formulae for the calculation of capacity and characteristics of the equipment are given. FL

18

[Proteolytic degradation of milk protein by bacteria. II. The action of psychrophilic bacteria and lactobacilli on milk protein.] Proteolytischer Abbau der Milcheiweissstoffe durch Bakterien. II. Die Wirkung von psychrophilen und milchsäurebildenden Bakterien auf die Eiweissstoffe in der Milch.
Pürschel, M.; Pollack, C.
Nahrung 16 (5) 451-459 (1972) [23 ref. De, en, ru] [Sektion Tierproduktion und Vet. Med., Humboldt-Univ., Berlin, German Democratic Republic]

The proteolytic action of 7 psychrophilic bacteria (5 Pseudomonas, 1 Achromobacter and 1 Aeromonas) and 7 lactic acid bacteria (Lactobacillus acidophilus, L. bulgaricus, L. casei, L. helveticus, L. lactis, L. plantarum and Streptococcus thermophilus) on milk protein was studied by means of starch gel electrophoresis. Degradation of the casein complex by the psychrophilic bacteria varied according to bacterial count and incubation time (2-8 days); breakdown was greater at 20°C than at 37°C, and most strains attacked β-casein to a greater degree than α-casein. The lactobacilli produced no changes in the milk protein that were detectable by starch gel electrophoresis; the increase in residual N in the milk, however, suggested slight proteolysis. [See FSTA (1969) 1 5P465 for part I.] ADL

19

[Influence of single and associated strains of L. bulgaricus and Str. thermophilus as well as milk treatments on the production of acetaldehyde in yoghurt.]
Bottazzi, V.; Battistotti, B.; Montescani, G.
Lait 53 (525/526) 295-308 (1973) [22 ref. Fr, en] [Istituto di Microbiol. Lattiero-casearia, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

7 strains of Lactobacillus bulgaricus and 3 of Streptococcus thermophilus isolated from commercial yoghurt were tested for sugar fermentation, serological group, DNA base composition and acetaldehyde production. 4 of the L. bulgaricus strains produced only limited amounts of acetaldehyde in UHT milk which had a pH or greater amounts on autoclaved UHT milk which had a pH of 3.75-3.87; they produced considerably more acetaldehyde in UHT milk when grown in association with Str.

20

New proteolytic enzyme and its preparation.
Belloc, A.; Florent, J.; Mancy, D.; Verrier, J. (Rhone-Poulenc SA)
British Patent 1 330 390 (1973) [En]

The enzyme (25, 048 RP) is obtained by culturing aerobically a microorganism of the genus Streptomyces, named 'S. nebulosus DS 14, 579' in a medium containing assimilable C and N. The enzyme has max. proteolytic activity on casein at pH 8 in the temp. range 37-65°C, and is said to be capable of hydrolysing more peptide bonds than trypsin. It is inactivated by heating at 75°C for 6 min. FL

21

Medium for the selective enumeration of lactic acid bacteria from foods.
Davidson, C. M.; Cronin, F.
Applied Microbiology 26 (3) 439-440 (1973) [6 ref. En] [Canada Packers Ltd., Res. & Development Lab., Toronto 9, Ontario]

The selective agar medium (NAP) consists of a sterile basal nutrient medium to which is added, just prior to use, filter-sterilized $NaNO_2$, actidione and polymyxin B. Lactobacillus (except L. viridescens), Streptococcus, Pediococcus and Leuconostoc spp. grew equally well on both NAP and the basal medium alone; the only non-lactic acid bacteria which grew on NAP were Bacillus pantothenticus and, to a small extent, 2 strains of Staphylococcus epidermidis and 1 of Bacillus subtilis. In tests on 21 samples of meat and meat products, 14 of dairy products and 4 miscellaneous food samples, total counts on the basal medium did not differ significantly from those on APT agar (Difco), and in 32 cases the count on NAP compared well with the total catalase-negative count on the basal medium. CDP

22

[Lactic acid bacteria in champagne manufacture.]
Ivanova, I. P.; Bashtannaya, I. I.
Vinodelie i Vinogradarstvo SSSR No. 4, 25-27 (1973) [Ru] [Moldavskii Nauchno-issled. Inst. Sadovodstva, Vinogradarstva i Vinodeliya, USSR]

Lactic acid bacteria were studied during manufacture of bottled champagne. 52 coccus strains and 48 rod strains were isolated. Homofermentative types prevailed, which ferment sugar to lactic acid without formation of volatile acids; these types include, in particular, Streptococcus and Lactobacillus spp. The effect of SO_2, alcohol, active acidity and temp. was investigated. All these factors, when kept within the limits of technological parameters, did not affect

23

Aflatoxin and rubratoxin produced by Aspergillus parasiticus and Penicillium rubrum when grown independently, associatively, or with Penicillium italicum or Lactobacillus plantarum.
Aldermann, G. G.; Emeh, C. O.; Marth, E. H.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung **153** (5) 305-311 (1973) [22 ref. En, de] [Dept. of Food Sci., Univ. of Wisconsin, Madison, USA]

Asp. parasiticus (i) and P. rubrum (ii) were grown separately, associatively, or in combination with P. italicum (iii) and/or L. plantarum (iv). A glucose-salts broth and single strength and conc. grapefruit juice served as substrates. In broth incubated at 28°C for 7 days, production of aflatoxin by (i) was enhanced when the culture also contained (ii) + (iv), was unaffected by (iii), and was reduced by (ii), (ii) + (iii), or (iv). Production of aflatoxin in single strength grapefruit juice held at 28°C for 7 days was enhanced when (i) grew together with (ii) and (iv). Presence of all other cultures or combinations reduced aflatoxin production. Similar results were obtained with conc. grapefruit juice except that less aflatoxin was produced by all combinations of cultures. Rubratoxin production in broth was enhanced when (ii) grew in association with (i). All other combinations of cultures yielded less rubratoxin than did (ii) by itself. In single strength grapefruit juice, (i) caused a marked decline in rubratoxin production. Slight increase in yield of rubratoxin were obtained when cultures contained (iv) or (i) + (iv). Other combinations of cultures neither enhanced nor reduced rubratoxin production. All combinations of cultures enhanced rubratoxin production in conc. grapefruit juice with the highest yield appearing when (i) and (iv) grew together with (ii). Production of rubratoxin was similar in single strength and conc. grapefruit juice. AS

24

[Two rapid methods for quantitative assessment of cultures and cultured milk products, as regards total counts, cocci-rods ratio and aroma production.]
Zwei Schnellmethoden zur quantitativen Beurteilung von Säuerungskulturen und Sauermilcherzeugnissen bezüglich Keimgehalt, Kokken-Stäbchen-Verhältnis sowie Aromabildung.
Seeler, G.; Holderied, A.; Schäfer, H.
Deutsche Milchwirtschaft **24** (42) 1776-1777 (1973) [1 ref. De] [Fachbereich Milch- und Molkereiwirtschaft in Ahlem der Fachhochschule, Hanover, Federal Republic of Germany]

In the 1st method described (used for the morphological differentiation and counting of lactic acid bacteria), the sample is diluted with distilled water, mixed with NaOH, diluted again and then mixed with methylene blue solution. Final dilution is 1:20. Counting is commenced about 5 min after placing the sample in the counting chamber, each chain of cocci and bacilli (irrespective of its length) being considered as an "unstandardized counting unit". Using special factors these units can then be converted to "standardized" units, giving a corrected count based on an average standardized length of chain. The 2nd method described (for semi-quantitative assessment of the acetaldehyde content of yoghurt) is based on the procedure of Schulz & Hingst [see Milchwissenschaft (1954) **9** (10) 330-336 & **9** (11) 361-365] using the colour reaction of yoghurt with sodium nitroprusside and hexamethyleneimine. Dark brown indicates 0.001% acetaldehyde, and dark blue 0.005%. ADL

25

Survival and activity of lactic streptococci following storage at 22°C and 4°C.
Pearce, L. E.; Brice, S. A.; Crawford, A. M.
New Zealand Journal of Dairy Science and Technology **8** (2) 41-45 (1973) [9 ref. En] [New Zealand Dairy Res. Inst., Palmerston North]

When Streptococcus cremoris HP and AM_2 and Str. lactis ML_8 were grown at 22°C in reconstituted dried skim-milk (RSMP) for inoculation into cheese milk, acid development in the cheese milk was max. when pH of the inoculated bulk starter was 4.6-4.7. The pH of the inoculum affected the length of the initial lag phase but had little effect on rate of acid production once established; however, acid production was markedly slower in cheese milk inoculated with strain HP at pH 4.2. When strain HP was stored at 4°C in RSMP before being subcultured into the same medium at 22°C, initiation of acid production on subculture became progressively delayed with increase in storage time, but rate of acid production once logarithmic growth had become established was the same for all cultures stored for up to 10 days; cultures stored for longer periods (up to 23 days) showed decreased viability and rate of acid production on subculture but could be restored to normal activity by 2 or 3 subcultures. Practical implications of these results in the maintenance of activity in commercial bulk starters and mother cultures is discussed. CDP

26

Studies on exocellular and endocellular lipases of some of the lipolytic bacteria.
Singh, A.; Srinivasan, R. A.; Dudani, A. T.
Milchwissenschaft **28** (3) 164-166 (1973) [15 ref. En, de] [Dairy Microbiol. Div. Nat. Dairy Res. Inst., Karnal, India]

Lipase activity on butter oil substrate was measured as described by Alford & Pierce [Journal of Bacteriology (1963) **86**, 24] on 6 'non-lactic' organisms (Pseudomonas fragi, Serratia marcescens, Micrococcus freudenreichii, Sarcina lutea, Staphylococcus aureus and Bacillus subtilis) isolated from buffaloes' milk Cheddar cheese; exocellular lipase activity/mg protein ranged from 0.412 (M. freudenreichii) to 1.566 (Ps. fragi), and endocellular lipase activity as a % of exocellular activity ranged from 0.81 (S. marcescens) to 5.80 (Ps. fragi). Pasteurization at 63°C for 30 min

destroyed 49.4-68.1% of the exocellular and 82.3-89.9% of the endocellular lipase; Staph. aureus lipase was the most resistant to pasteurization. No exocellular lipase activity was found in lactic acid bacteria and the endocellular enzyme did not hydrolyse butterfat; tributyrin was hydrolysed by the endocellular enzyme of all 5 lactic acid bacteria tested, and tripalmitin and triolein were hydrolysed slightly by Str. lactic (2 strains tested) and Lactobacillus plantarum but not by Str. cremoris or L. casei. Tributyrin, tripalmitin and triolein were hydrolysed by both exo- and endocellular lipases of the 6 non-dairy organisms. CDP

27

[Lactic microflora of 'Vacherin Mont-d'Or' cheeses.]
Sozzi, T.; Maret, R.
Lait **53** (525/526) 280-294 (1973) [18 ref. Fr, en] [Dept. de Developpement Tech., Societe d'Assistance Tech. pour Produits Nestle SA, Lab. Ind., 1350 Orbe, Switzerland]

Biochemical characteristics were determined of 94 strains of lactic acid bacteria isolated during ripening of 'Vacherin Mont-d'Or' cheeses. Of the 67 strains of cocci isolated, 16 were leuconostocs, of which 7 reduced and coagulated litmus milk and 9 had no effect on litmus milk. The 51 homofermentative cocci were classified as 9 Streptococcus lactis, 2 Str. cremoris, 1 Str. thermophilus and 39 enterococci. Of the 27 Lactobacillus isolates, 22 resembled L. plantarum in producing DL-lactic acid, and 5 resembled L. casei in producing only L(+)-lactic acid. Because of the diversity of flora in traditional Vacherin cheeses, it is concluded that the addition to pasteurized milk of traditional starters containing only 1 or 2 specific strains would not produce typical taste and aroma. [See also FSTA (1972) **4** 9P1375.] CDP

28

A microbiological study of South African Gouda cheese. I. Occurrence of lactic acid bacteria.
Holzapfel, W. H.; Mostert, J. F.
South African Journal of Dairy Technology **5** (3) 135-138 (1973) [12 ref. Af, en] [Animal & Dairy Sci. Res. Inst., Irene, Transvaal]

26 cheeses from 20 different cheese factories were analysed microbiologically for total viable bacterial content, starter streptococci and non-starter lactic acid bacteria ("LLP-group") after 1, 4, 6 and 8 wk of ripening. Total viable counts after 1 wk varied between 1.3×10^7 and 1.09×10^9/g and were related neither to the rate of ripening nor to the quality score. The rate of decrease in number of starter streptococci during ripening appeared to correspond to a certain extent with the quality of the cheese. Approx. 50% of the cheeses contained ≥1 million pediococci/g after 4 wk. Cheeses containing large numbers of pediococci gave higher grading scores than those without any detectable pediococci. All cheeses contained lactobacilli which constituted the majority of the LLP-group, yet their numbers could not be correlated with any tendency towards better quality. Leuconostocs were detected in 1 sample only. AS

29

Growth of Streptococcus cremoris and Streptococcus lactis in a chemostat. Production of cells and survival of bacteria during frozen storage.
McDonald, I. J.; Reiter, B.; Rogers, P. L.
Canadian Journal of Microbiology **19** (10) 1285-1295 (1973) [24 ref. En, fr] [Div. of Biol. Sci., NRCC, Ottawa]

Str. cremoris HP and Str. lactis 829 were grown in chemostats in tryptone yeast extract broth and in supplemented 2% skim-milk medium. In both media, lactose was the limiting nutrient. Cultures were grown at various dilution rates in media poised at constant pH and temp., and also at constant dilution rates in media controlled at different pH levels and temp. The effects of the various conditions of growth on production of bacteria, viable counts, and acid-producing activities of cells, and on the ability of bacteria to survive subsequent frozen storage were determined. None of the conditions of growth tested had very pronounced effects on the ability of cells to survive or on the inability of cells to retain acid-producing activity after being frozen at -70°C and stored at -40°C. AS

30

[Effect of some factors of development of lactic acid bacteria in buttermilk.]
Sukhotskene, I. [Suchockiene, J.]
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti 7, 301-306 (1973) [5 ref. Ru, li, en] [Litovskii Filial Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Vil'nius, USSR]

Multiplication of a lactic acid bacteria starter was studied for ≤18 h in buttermilk (from sweet-cream butter churning) containing 0.4% or 3.2% or 6% (added) butterfat and in milk with 3.2% fat. Addition of fat progressively intensified growth of aroma-producing streptococci (AS) in buttermilk; in the initial stages of culturing, streptococci constituted a greater proportion of the total lactic acid bacteria (TL) in buttermilk than in milk. At 18 h, numbers of AS and TL were 50.4 million and 635 million/ml respectively in milk, whilst in buttermilk corresponding figures (in millions/ml) were 20 and 460 for that containing 0.4% fat, 20 and 300 (3.2% fat) and 29 and 375 (6% fat). SKK

31

Acid production by Streptococcus lactis in low-lactose skim-milk.
Richter, R. L.; Reineccius, G. A.; McKay, L. L.
Journal of Food Science **38** (5) 796-798 (1973) [17 ref. En] [Dept. of Food Sci. & Nutr., Univ. of

Minnesota, St. Paul, 55101, USA]

Limiting the lactose content of milk was examined as a means of controlling dairy fermentations. Low-lactose milk (<0.2%) was prepared from 11% reconstituted dried skim-milk by cycling it several times through Sephadex G-25 in a basket centrifuge. Acid production by lactic streptococci [Streptococcus lactis C_2F] was restricted in the low-lactose milk, and supplementation with lactose [4%] did not restore normal acid production. Supplementation with yeast extract, metals and lactose was required to regain acid production comparable to that in the untreated milk. IFT

32

[Proteolytic action of lactic streptococci. I. The action of mesophilic lactic streptococci on N constituents of milk.]
Kikuchi, T.; Desmazeaud, M.; Bergere, J. L.
Lait **53** (527) 369-385 (1973) [30 ref. Fr, en] [Lab. de Biochimie Microbienne, INRA, CNRZ, 78350 Jouy-en-Josas, France]

Strains of Streptococcus lactis, Str. cremoris and Str. diacetilactis were grown in a UHT (145°C for 15 s) treated skim-milk medium at 30°C for 6 or 16 h or 10 days. The lactic acid content and several N fractions (total N, soluble N after precipitation at pH 4.6, non-protein N after precipitation with 12% trichloroacetic acid, amino acid and soluble peptide N after precipitation with phosphotungstic acid, and ammonia N) were determined in the 10-day cultures. With each of the species, the distribution of N in the culture was similar irrespective of whether the strain was a fast or medium lactic acid producer. The amount of soluble N produced was low (16.5-19.8%) especially with slow acid-producing strains. Str. cremoris and Str. diacetilactis were slightly more proteolytic than was Str. lactis. The action of these bacteria on the milk proteins resulted in an increase in the low mol. wt. compounds and a slight hydrolysis of casein. MEG

33

[Formation of diacetyl in cultures prepared in whole milk and skim-milk.]
Lazauskas, V.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti **7**, 289-291 (1973) [6 ref. Ru, li, en] [Litovskii Filial Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Vil'nius, USSR]

'Kaunas culture type L' consisting of 3-4 strains of Streptococcus lactis, 3-4 of Str. cremoris and 1-2 of Str. diacetilactis was cultivated at 25°C in autoclaved skim-milk or whole milk for 16 h. The acidity of the whole milk culture was 4.2°T lower than that of the skim-milk culture, but no significant differences were observed in the numbers of aroma-producing bacteria (215 vs. 217.5 million/ml), diacetyl content (0.570 vs. 0.580 mg%), consistency or aroma and flavour of the 2 cultures. FL

34

[Diacetyl content of starters and fat-free curds manufactured from lactic acid bacterial concentrates, frozen and stored in liquid nitrogen.]
Lacrampe, J. L.; Weber, F.
Lait **53** (528) 491-519 (1973) [67 ref. Fr, en, es] [Univ. de Poitiers, Lab. de Biol. et Biochim., IUT de La Rochelle, BP 536, France]

Production of diacetyl by experimental and industrial starter cultures was optimum at a temp. of 21°C and a pH of 4.35. The diacetyl content of fat-free curds was lower than that of the cultures used for their manufacture. On storage at 5°C the diacetyl content of the curds increased from 0.70-0.90 (immediately after manufacture) to 1.66-2.50 ppm on the 12th day and then decreased gradually. Curds stored for 5 days at 5°C and then at 18°C rapidly decreased in diacetyl content. Optimum conditions for preparing starter cultures from frozen lactic acid bacteria concentrates are described. CDP

35

[Use of mixed starters in the manufacture of 'Mechnikov' sour milk, yoghurt and ryazhenka.]
Koroleva, N. S.; Mel'nikova, E. V.
Molochnaya Promyshlennost' No. 10, 4-6 (1973) [5 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Following successful experiments with the use of a Bulgarian yoghurt starter (Streptococcus thermophilus and Lactobacillus bulgaricus) in the manufacture of ryazhenka, this starter was introduced in commercial production of ryazhenka, 'Mechnikov' sour milk and yoghurt at the Cherkiz dairy factory to supersede a procedure using the 2 organisms as separate cultures. Use of the mixed starter reduced the manufacturing time of the 3 products by 85 min, saved milk in starter preparation, and gave products of uniform quality. FL

36

[Chemical and microbiological changes in stored yoghurt.]
Ottogalli, G.; Resmini, P.; Rondinini, G.; Saracchi, S.
Annali di Microbiologia ed Enzimologia **22** (1/2/3/4) 71-79 (1972) [10 ref. It, en] [Istituto di Microbiol. Agraria e Tecnica, Univ. di Milano, Italy]

Samples of plain yoghurt (full-fat or 1% fat) and fruit yoghurt (orange and lemon) were stored for 60 days at either 4 or 20°C. At 4°C, both types of plain yoghurt showed a gradual reduction in lactic acid bacteria (from 10^8-10^9 and 10^7-10^8/ml

respectively to virtually zero after 60 days), and an increase in free amino acids (from 36.31 to 38.67 and from 35.39 to 36.69 mg/100 ml ultrafiltrate), but no changes in the electrophoresis patterns of the casein molecules. At 20°C, the lactic acid bacteria disappeared after about 30 days in both types of plain yoghurt and there were marked increases in free amino acids (to 44.28 and 50.04 mg/100 ml respectively). In the fruit yoghurt the lactic acid bacteria disappeared after 20 days at 4°C and after only 15 days at 20°C (presumably due to natural bactericidal agents in the citrus fruit) but the free amino acids (44.25 mg/100 ml initially) did not increase at either temp.; all samples showed changes in electrophoresis patterns at the α_s-casein level after 60 days at 20°C. All the yoghurts retained their organoleptic characteristics unchanged for ≥30-45 days. ADL

37

[Possibility of using buttermilk for starter preparation for use in butter manufacture.]
Sukhotskene, I.; Kacherauskis, D.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti **7**, 61-71 (1973) [12 ref. Ru, li, en]

'Kaunas' type L culture, consisting of diacetyl-producing strains of Streptococcus lactis, Str. cremoris and Str. diacetilactis was cultivated in (i) milk (control), (ii) buttermilk/milk mixture (ratio 85:15) and (iii) buttermilk. Total counts of aroma-producing bacteria were highest (29.1×10^6/ml) in (i) and similar (20.5×10^6/ml) in (ii) and (iii). Diacetyl production (per 200 ml culture) was higher (about 7-8.4 mg) in (ii) and (iii) than in (i) (2.6 mg) whilst acetoin production was lower (36.7-37.8 mg) in (ii) and (iii) than in (i) (44.8 mg). In subsequent experiments, ripened-cream butter was made from cream cultured with starters (i) and (ii). Diacetyl content (mg/200 g) of butter made with (i) and (ii) respectively was: when fresh, 1.5 and 3.78; after 1 month at -10°C, 2.05 and 2.80; and after 6 months at -10°C, 2.62 and 8.45. Acetoin levels of both butters varied between 5.6 and 8.9 mg/200 g. The survival period of aroma-producing bacteria was longer in butter from cream cultured with (ii) than in control butter. FL

38

[Microbiology of wine. Report of the 9th meeting of the study group.]
Office International de la Vigne & du Vin
Bulletin de l'O.I.V. **47** (515) 23-41 (1974) [Fr] [11 Rue Roquepine, Paris 8e, France]

A brief report is given of the 9th meeting of the study group on wine microbiology, held in Paris on May 15th 1973. The report contains the following sections: studies on wine yeasts (use of pure cultures of wine yeasts, enzymatic properties of yeasts); studies on lactic acid bacteria in wine (catalogue of strains, methods used for determining lactic acid bacteria, new industrial trials with lactic acid bacteria inwine); studies of methods for the biological control of wines; research on antiseptics in wines; and microbiological methods for determining vitamins in wines. JA

39

Antimicrobial properties of oleuropein and products of its hydrolysis from green olives.
Fleming, H. P.; Walter, W. M., Jr.; Etchells, J. L.
Applied Microbiology **26** (5) 777-782 (1973) [14 ref. En]

Antibacterial action of oleuropein and its hydrolsis products against certain species of lactic acid bacteria involved in the brine fermentation of olives was investigated. Oleuropein was not inhibitory, but 2 of its hydrolysis products, the aglycone and elenolic acid, inhibited growth of the 4 species of lactic acid bacteria tested [Lactobacillus plantarum, L. brevis, Leuconostoc mesenteroides and Pediococcus cerevisiae]. Another hydrolysis product, β-3,4-dihydroxyphenylethyl alcohol, was not inhibitory. The aglycone of oleuropein and elenolic acid were much more inhibitory when the broth medium contained 5% NaCl; 150 μg of either compound/ml prevented growth of L. plantarum. A crude extract of oleuropein, tested by paper disk bioassay, was inhibitory to 3 [Staphylococcus aureus, Bacillus subtilus and Pseudomonas solanacearum] of 17 species of bacteria screened. The acid hydrolysate of the extract was inhibitory to 11 of the bacteria, which included 4 species of lactic acid bacteria and other Gram-positive and Gram-negative species. Neither crude preparation was inhibitory to growth of the 7 species of yeasts tested. A possible explanation is given for the previously reported observation that heating (3 min, 74°C) olives prior to brining renders them more fermentable by lactic acid bacteria. Results of a brining experiment indicated that oleuropein is degraded to antibacterial compounds when unheated olives are brined.
AS

40

[Microflora of natural starters.]
Sozzi, T.
Latte **46** (12) 844-847 (1972) [7 ref. It, en] [Istituto di Microbiol. Agraria e Tecnica, Univ. di Bologna, Italy]

The microflora in 20 starters used in the production of soft Italian cheese in different localities was isolated on MRS agar and quantitatively determined after anaerobic incubation at 40°C for 48 h. It comprised 87% Streptococcus thermophilus, 9% Streptococcus faecalis, and 3% Lactobacillus spp. Each isolate was incubated in sterile milk at 40 and 30°C, and individual strains were isolated according to morphological characteristics, acidifying and fermentative activity in milk, using the methods previously described [FSTA (1973) 5 9P1412]. Of the Str. thermophilus isolates, 88% were 'fast' strains coagulating milk in 3 h. 2 types of Str. faecalis were

also isolated: 28.5% were type I and showed no increase in acidity after 6 h; the others were type II and showed an increase of 10°SH in acidity after 6 h. MC

41

A note on the resistance of Bacillus spp., faecal streptococci and Salmonella typhimurium to an inhibitor of Clostridium spp. formed by heating sodium nitrite.
Roberts, T. A.; Garcia, C. E.
Journal of Food Technology 8 (4) 463-466 (1973) [5 ref. En] [Meat Res. Inst., Langford, Bristol BS18 7DY, UK]

An inhibitor of Clostridium spp. formed by autoclaving sodium nitrite in a laboratory medium also inhibited, at pH 6.0, 9 of 14 strains of Bacillus spp. B. circulans, B. polymyxa, B. macerans, B. pantothenticus and Bacillus F were resistant. Streptococcus durans was inhibited but Strep. faecium, Strep. faecalis and Strept. faecalis var. zymogenes were not. Salmonella typhimurium was not inhibited. Spoilage of sub-lethally processed cured meats by Bacillus spp. is not a common problem, but spoilage has been reported due to B. subtilis, B. cereus, B. megaterium and B. polymyxa as well as the denitrifying strains like Bacillus F. Of these, Bacillus F and B. polymyxa were resistant to heated nitrite, and B, subtilis and B. megaterium were sensitive. It is therefore not clear whether heated nitrite plays any role in the stability of pasteurized cured meats. AS

42

[Lactic acid bacteria in animal industry.] [Review]
Morichi, T.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 44 (11) 535-553 (1973) [338 ref. Ja] [Nat. Inst. of Animal Ind., Chiba-shi 280]

43

[Heat resistance of Lactobacillaceae.]
Casolari, A.; Campanini, M.
Industria Conserve 48 (3) 140-143 (1973) [7 ref. It, en, fr, de] [Sta. Sperimentale per l'Ind. delle Conserve Alimentari, Parma, Italy]

In connection with the problems of spoilage of fruit concentrates and juices due to the growth of Lactobacillus and Leuconostoc spp., tests were carried out to determine the heat resistance characteristics of L. casei ATCC 7460, L. büchneri (isolated from pears in syrup) and Leuc. dextranicum (isolated from tomato concentrate). It was established that heat resistance increased with increasing pH, reaching a max. at approx. neutrality; on the basis of the soluble solids content, the max. heat resistance was at an optical residue of about 20%, and pH 4.2. In practical terms this means that fruit products can be stabilized more easily when their soluble solids content is relatively high, particularly at low pH values. HBr

44

[Microbiology in the brewing industry.]
Garcia Galindo, J.
Birra e Malto 20 (8) 287-291 (1973) [9 ref. It] [El Aguila Sa, Madrid, Spain]

Precautions taken at different stages of beer production to avoid extraneous microbial contamination are discussed in general terms with reference to procedures used at the El Aguila brewery. The probable contaminants, lactic acid bacteria, pediococci, Flavobacterium, Achromobacter, and wild yeasts, are discussed on the basis of literature data. SKK

45

New contributions on the aseptic filling of beer.
Posada, J.; Galindo, J. G.; Palomero, F. L.
Proceedings, European Brewery Convention 14th Congress, 399-418 (1973/publ. 1974) [22 ref. En, de, fr] [El Aguila SA, Madrid, Spain]

The major part of this study was concentrated on the filler. 2 main aspects are considered: sterilization and atmospheric air. Bottles filled initially showed much greater contamination than those racked in the following period. Good results were obtained with recirculating systems for cleaning the fillers, with special systems for each type of machine, in order to obtain complete sterilization of inner and outer parts of the racker. A new filling method is described which permits separation of atmospheric air from the empty bottle from counterpressure air. In this way it is possible to keep sterile the air or CO_2 which is inside the filler in continuous contact with beer. Principles of laminar flow of sterile air were utilized to enable the corker to work in an atmosphere protected against exterior pollution. With regard to keg filling, the importance of lactobacilli contaminations from the container due to lack of sterilization is stressed. Quality control using selective media and recent techniques for cultivating lactic rods are discussed. It is considered that these techniques could be followied without difficulties in quality control laboratories in breweries. AS

46

[Microbiological status of, and content and configuration of lactic acid in, commercially produced yoghurt in Switzerland.]
Mikrobiologischer Zustand, sowie Menge und Konfiguration der Milchsäure des industriell hergestellten Joghurts in der Schweiz.
Puhan, Z.; Flüeler, O.; Banhegyi, M.
Schweizerische Milchwirtschaftliche Forschung 2 (Nov.) 37-45 (1973) [23 ref. De, en, fr] [Milchtech. Inst., Eidgenössische Tech. Hochschule, Zürich, Switzerland]

269 samples of commercial yoghurt (plain and flavoured) representing 10 different producers throughout Switzerland were purchased from small

and large shops in Zurich between Dec. 1972 and March 1973. 77% were made from whole milk (≥3.5% fat), 17.1% from partially skimmed milk (≥2.0% fat) and 5.9% from skim-milk (≤0.5% fat). The average count of lactic acid bacteria on the medium of Elliker et al. [Journal of Dairy Science (1956) **39** (11) 1611-1612] overlayered with Rosenberger's medium [Winkler, Milchwissenschaft (1966) **21** (10) 624-631] was 500/ml, streptococci (on similarly overlayered Streptosel agar) accounting for 60-80% of the total. Numbers of lactic acid bacteria decreased in yoghurt older than 6-8 days, and at 16-20 days were only 64% of those at 2 days. 10% of the samples showed slight contamination with yeasts and moulds (max., 8500/ml); and 3% of the samples contained >10 coliform cells/ml (max., 300/ml). Lactic acid content ranged from 0.9 to 1.2% and ratio of L- to D-lactic acid decreased with sample age from 60:40 to 45:55, as the D-lactic acid increased while the L-lactic acid remained fairly constant. SKK

47

[Changes caused by lactic acid bacteria in yoghurt stored at different temperatures.] Die durch Milchsäurebakterien verursachten Veränderungen während der Lagerung von Joghurt bei verschiedenen Temperaturen.
Puhan, Z.; Banhegyi, M.; Flüeler, O.
Schweizerische Milchwirtschaftliche Forschung **2** (Dec.) 53-59 (1973) [9 ref. De, fr, en] [Milchtech. Inst., Eidgenössische Tech. Hochschule, Zurich, Switzerland]

Storage experiments for 42 days at 4° and 8°C and for 36 days at 14°C were carried out with (i) plain yoghurt prepared in the authors' laboratory using 2-3% of a commercial starter (incubation temp. 42°C; initial pH, 4.29, 4.11, 3.92 and 3.78), and (ii) 4 commercial yoghurts (plain or flavoured) with initial pH of 4.03, 4.07, 4.23 and 3.93. Samples taken 2 ×/wk were examined for pH, titratable acidity and contents of D- and L-lactic acids, streptococci and lactobacilli were enumerated using selective media [See preceding abstr.]. Numbers of streptococci in all yohgurts with initial pH >4 increased until pH declined to 4.0 ± 0.05 and then diminished rapidly; numbers of lactobacilli changed only little in (i) for the 1st 15-20 days and then decreased appreciably; in (ii), numbers increased appreciably during 10-15 days in those with initial pH >4 and then decreased. Content of L-lactic acid increased with the rise in numbers of lactic acid bacteria to a max. of 0.67-0.73 g/100 g and remained constant thereafter, while the content of D-lactic acid increased throughout storage, fast initially and then more slowly. Survival of Streptococci and Lactobacilli at end of storage tended to be inversely related to storage temp. SKK

48

[Citrate-fermenting lactic acid bacteria and Pecorino cheese blowing.]
Pettinau, M.; Ledda, A.; Arrizza, S.; Bottazzi, V.
Scienza e Tecnica Lattiero-Casearia **23** (2) 131-146 (1972) [9 ref. It, en] [Istituto Zootecnico e Caseario per la Sardegna, Sassari, Italy]

Citrate-fermenting lactic acid bactria (CFLAB) have been found to be associated with blowing in Pecorino-Romano cheese [see FSTA (1972) **4** 3P304]. This study investigated the major source of this contaminant and possible ways of eliminating it. Experimental cheeses were prepared using 4 treatments: (i) whey starter, containing non-citrate-fermenting lactic acid bacteria; (ii) without whey starter; (iii) CFLAB (isolated from cheese) + whey starter; (iv) CFLAB only. The results showed that max. numbers of CFLAB were present on the 15th day in all treatments, being 0.09, 245, 628, 922 × 16^6/g dry wt. for (i)-(iv) respectively. The reduced blowing in cheeses made with whey starter was attributed to the low numbers of CFLAB, which were suppressed by the bacteria in the whey starter. It was also found that rennet was an important source of CFLAB. In salted and unsalted rennet, which initially contained 244 × 10^6 and 295 × 10^6 CFLAB/ml, respectively, these organisms were no longer detectable after 60 and 90 days. In order to prevent blowing, it is recommended that whey starter be used and that rennet should be stored for >3 months or salted and stored for 2 months. MC

49

[Selection of Streptococcus lactis strains with enhanced nisin production.]
Jakubczyk, E.; Lipinska, E.; Szadkowska, M.; Lipniewska, D.
Roczniki Instytutu Przemyslu Mleczarskiego **15** (2) 97-106 (1973) [15 ref. Pl, ru, en] [Inst. Przemyslu Mleczarksiego, Warsaw, Poland]

2 nisin-producing Streptococcus lactis strains were exposed to UV and/or X-rays, and 54 strains with increased nisin-producing capacity were isolated. Most lost this increased capacity after subculturing, but 2 retained it after freeze-drying, storage for 6 months and subculturing 4 ×. They produced 1500-2000 units nisin/ml in milk and 8000-10 000 units/ml in neutralized medium. SKK

50

[Specificity of action of antibodies neutralizing Streptococcus lactis phages.]
Strzalkowska Domanska, M.; Bednarska, Z.; Kalinowski, L.
Roczniki Instytutu Przemyslu Mleczarskiego **15** (2) 5-23 (1973) [7 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

4 strains of Streptococcus lactis, 2 of Str. diacetilactis and 2 of Str. cremoris and the 8 relevant phages, were tested against phage-neutralizing antibodies prepared against 3 phages (1 for each streptococcal sp.) lacking cross-lytic properties. It was found that (i) antibodies homologous for the phage of one species were

capable of neutralizing heterologous phages of the other spp.; (ii) homologous and related phages were neutralized more effectively than were heterologous phages; and (iii) the rate of phage-inactivation increased with increase in antibody titre. It is concluded that for immunization of cows, suitably selected phages with a broad spectrum of activity should be used. [See also Poczn. Inst. Przem. mlecz. (1971) **13** (2) 63-70.] SKK

51

[Problem of the viability of cultures in stored yoghurt.] Beitrag zur Frage der Dauer der Lebensfähigkeit der Kulturen im gelagerten Joghurt.
Glättli, H.; Flückiger, E.; Schenker, G.; Walser, F.
Schweizerische Milchzeitung **100** (11) 67-68 (1974) [4 ref. De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld, Switzerland]

Two different yoghurt starters ((i) normal culture and (ii) a culture in which the 2 bacterial species were cultured separately) were used in the preparation of yoghurt from whole milk fortified with 1.5% dried skim-milk (pasteurization at 86°C for 10 min); on incubation at 42°C both cultures had about the same acidifying capacity. During 80-day storage of the yoghurts at 5°C, the decline in the numbers of viable lactic acid bacteria was very slow for both types of the starter used (log counts fell from e.g. about 9 to 8). At storage temp. of 10 and 20°C, the viable counts of lactic acid bacteria began to fall rapidly after 40 and 25 days respectively. In yoghurt made with (i), the Lactobacillus bulgaricus/Streptococcus thermophilus ratio remained approx. constant at all 3 storage temp., whilst in that made with (ii) the ratio changed, particularly at 5°C. It is concluded that even during 80-day storage of yoghurt at refrigerator temp. (5°C), the requirement that counts of viable yoghurt flora do not fall to ≤1 million/ml would be met. FL

52

[Microflora in Bulgarian yoghurt.]
Ohara, N.; Kitahara, K.
Journal of Agricultural Science [Tokyo Nogyo Daigaku Nogatu Shuho] **17** (3) 247-254 (1973) [21 ref. Ja, en] [Dept. of Agric. Chem., Tokyo Univ. of Agric.]

3 types of lactic acid bacteria, designated as strains No. 1, No. 3 and No. 7, were isolated from Bulgarian yoghurt. From their morphological and physiological characteristics they were identified as Streptococcus thermophilus, Lactobacillus jugurt, and L. bulgaricus, respectively. In order to investigate the suggestion that L. bulgaricus should be combined with L. lactis, strain No. 7 was compared with L. bulgaricus ATCC 11842 and L. lactis newly isolated from fresh milk; results indicate that L. bulgaricus should remain as an independent species. Comparisons of single and mixed cultures revealed that strain No. 1 was the main curd producer and No. 3 the main acid producer; however, the rate of curd and acid formation was stimulated by mixed fermentation. AS

53

[Significance of Casol addition to rennets.] Die Bedeutung von Casol für Magenlabkulturen.
Steffen, C.; Baumgartner, A.; Kessler, A.
Schweizerische Milchzeitung **100** (9) 53 (1974) [4 ref. De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld, Switzerland]

Effect of Casol (mixture of 90% acetic acid with 10% propionic acid) on rennet extraction from vells was studied. To 3-g portions of vells, 10 ml 1st whey ("Fettsirte", 0.3-0.6% fat) at 54°C and 0, 0.25, 1.0 or 2.5 ml Casol were added, and the mixture was allowed to stand for 5-6 h, i.e. until the bulk of the 1st whey cooled to 30°C after having been heated to 58°C; the vol. of the vells/whey/Casol mixtures was made up to 1 l. with the cooled whey and the whole was incubated for 15 h at 30°C. In a modification of the procedure, the bulk of the whey was cooled rapidly, so that the time of 1st incubation of the vells/whey/Casol mixtures was reduced from 5-6 h to approx. 30 min. Contents of lactic acid bacteria, and of coliforms and other microbial contaminants as well as the lactobacilli/streptococci ratio were determined in the different preparations. The findings include: Casol addition appreciably reduced numbers of coliforms and other microbial contaminants; with increasing Casol addition, the lactobacilli/streptococci ratio increased in favour of lactobacilli; the 0.25 ml Casol addition had a favourable influence on microbiological composition of the final rennet preparation, but >1 ml had undesirable effects; and direct addition of Casol to the whey starter lowered pH and inhibited growth of streptococci. SKK

54

[Report of studies on Anios B X 5, an antiseptic product.]
Anon.
BIOS **4** (4) 219-222 (1973) [Fr]

Anios B X 5 was tested at 3 concn. (0.1, 0.2 and 0.4%) for its antimicrobial activity at 5°C against beer yeasts, Saccharomyces pastorianus, Sacch. diastaticus, moulds, lactobacilli and Sarcina. When added to bottled beer at a concn. of 8 or 20 ppm, the Anios B X 5 had no adverse effect on foam retention, nor did the addition of up to 2 ppm to pasteurized beer affect the colloidal stability after 2 wk at 50°C. MEG

55

[Chlorella beverage.]
Yakult Honsha Co. Ltd.
Japanese Patent 4 843 872 (1973) [Ja]

Process for producing lactic acid bacteria-containing beverages containing odourless Chlorella devoid of the usual green colour is described. IFT

56

[Reconstitution and activation of freeze-dried lactic acid bacteria.]
Mitic, S.; Otenhajmer, I.
Mljekarstvo **23** (10) 224-228 (1973) [6 ref. Sh] [Inst. za Mlekarstvo, Novi Beograd, Yugoslavia]

7 species of lactic acid bacteria were freeze-dried using a centrifugal drier, and their acid-producing activity was studied after reconstitution in sterile milks either alone or with 3 different additives. Streptococcus lactis, Str. thermophilus, Str. diacetilactis and Str. cremoris produced most acid in skim-milk enriched with 0.3% yeast extract, whilst skim-milk with 0.2% pancreatic extract was the most suitable medium for Lactobacillus acidophilus, L. bulgaricus and L. helveticus. Skim-milk with 3% added lactose had the least effect on activation of the bacteria, acid production being less than that obtained with non-enriched skim-milk. FL

57

[Proteolytic activity of lactic acid bacteria as a factor in flavour formation in cheese.] [Review]
Zvyagintsev, V. I.
Prikladnaya Biokhimiya i Mikrobiologiya **9** (5) 710-721 (1973) [119 ref. Ru, en] [All-Union Res. Inst. of Butter and Cheese Ind., USSR]

The proteolytic properties of different types of lactic acid bacteria are discussed, as well as the role of products of proteolysis in the formation of flavour and aroma compounds in cheese. Information is given on the preferential hydrolysis of individual caseins by different types of lactic acid bacteria, and on the effect of Eh and rennet on their proteolytic properties. ADL

58

Bacteriophage for Streptococcus thermophilus. [Lecture]
Reinbold, G. W.; Reddy, M. S.
Dairy Industries **38** (9) 413-416 (1973) [9 ref. En] [Dept. of Food Tech., Iowa St. Univ., Ames, 50010, USA]

3 unrelated host/phage combinations of Str. thermophilus were used to investigate different variables in the 2-layer agar plate technique. A simple and efficient method for separation of phage by destroying host cells and contaminating bacteria without affecting phage titre consists of adding 0.5 ml $CHCl_3$ to 15 ml milk, whey or broth sample (1 ml to more viscous media); after standing for two 5-min periods with shaking in between, the supernatant (containing the phage) is decanted and aerated to remove $CHCl_3$. Optimum procedure for the plate technique was: 3 ml of phage dilution in 0.85% saline were added to 2.6 ml 1% $CaCl_2 \cdot 2H_2O$ 3 0.4 ml of a 12-h skim-milk culture of host organism; after pre-incubation at 37°C for 15 min, 3 ml enriched tryptic soya agar are added and the mixture spread over 2 pre-dried plates of the same agar (pH 6.6) and incubated at 37°C for 18 h. Using these methods it was shown that large numbers of phage particles arrested culture growth whilst small numbers only retarded growth and acid production. In mixed strain cultures, presence of phage capable of lysing only one of the strains enhanced acid production, particularly when large numbers of phage were present. It is concluded that the overall economic importance of Str. thermophilus phage is difficult to assess. CDP

59

[Studies on Lactobacillus bifidus culturing in cows' milk.] Untersuchungen über die Vermehrung von Lactobacillus-bifidus-Kulturen in Kuhmilch.
Kisza, J.; Ziajka, S.
Milchwissenschaft **28** (11) 696-699 (1973) [14 ref. De, en] [Inst. Inzynierii i Biotech. Zywnosci, ART, Olsztyn, Poland]

In an investigation of the use of lactulose and pepsin-digested milk in connection with infant foods cultured with L. bifidus, strains 491, 557, 961 and 1060 of L. bifidus from the collection of the Hygiene Institute in Warsaw and strain J from the collection of the Institute of Immunology and Virology in Belgrade were cultured initially anaerobically on RCM medium and then for up to 48 h at 37°C in 300 ml (i) skim-milk, (ii) milk with 20% pepsin-digested milk, or (iii) milk with 2% lactulose syrup. pH, titratable acidity, and levels of lactose, non-protein N and peptide N were determined every 12 h. Count ranges (in millions/ml) of the 5 strains of L. bifidus after 24 h in (i)-(iii) respectively were 87-1395, 158-1620, and 80-1782, strain J always showing the highest counts and being well in advance of the other strains. Strain J was also the most active in all 3 media. On the whole, the metabolic activity of the strains in relation to medium was in the order (ii)>(i)>(iii) but the differences were not marked. SKK

60

[Microbiological study of the cause of slime formation in the brine of White pickled cheese.]
Yankov, Ya.; Denkov, Ts.
Izvestiya, Nauchnoizsledovatelski Institut po Mlechna Promishlenost, Vidin **6**, 103-111 (1972) [28 ref. Bg, ru, en]

In this study, brines from cows' milk White pickled cheese in cans were mostly used. It was established that slime may be caused by Lactobacillus plantarum and/or L. casei separately or jointly. The inhibitory preparations mentioned in the preceeding abstr. had no effective antibacterial activity against the 2 lactobacilli. Brines with pH <4.0 and >8% NaCl did not form slime; and those with pH 4.0-4.5 and 6-8% salt formed it only to a slight extent. SKK

61

[The effect of storage in a nitrogen atmosphere on the microflora of chilled meat.]
Kulikovskaya, L. V.; Balandina, G. A.
Kholodil'naya Tekhnika No. 3, 45-47 (1973) [16 ref. Ru] [Vses. Nauchno-issled. Inst. Kholodil'noi Promyshlennosti, USSR]

Cold storage of meat in a 99.8% N_2 atmosphere inhibits the growth of psychrophiles. Meat stored at 0°C in an N_2 atmosphere had a storage life of ≤25 days. Achromobacter spp. and Flavobacterium spp. were the predominant organisms in meat stored in air; lactobacilli were the predominant microorganisms in samples stored in an N_2 atmosphere. STI

62

[Studies on the antagonistic effect of lactic acid bacteria on other organisms in the flora of food products.] Untersuchungen zur antagonistischen Wirkung der Milchsäurebakterien auf andere Keimgruppen der Lebensmittelflora.
Reuter, G.
0941de **19** (4) 320-334 (1972) [44 ref. De, en, fr, es] [Inst. für Lebensmittelhygiene, Freie Univ., Berlin (West)]

The antagonistic effect of streptococci and lactobacilli against various bacterial species was estimated at time intervals by enumeration of the surviving test organisms and determination of pH values. The sensitivity appeared to be in descending order: pseudomonads, aeromonads, bacilli, Proteus staphylococci and enterococci. Although the acids produced were not identified it is suggested that the lactic acid produced by streptococci and homofermentative lactobacilli was the most inhibitory; nevertheless, other antagonistic metabolites or nutritive composition between bacterial species were not excluded. It is stressed that the number of lactic acid bacteria in foodstuffs should exceed considerably the number of contaminating enterococci so that the latter can be suppressed; thin is particularly true for continental-type sausages. BR

63

[Model for a bacteriological information system at the Streptococci Centre.] Modell für ein bakteriologisches Informationssystem der Streptokokken-Zentrale.
Hahn, G.; Reichmuth, J.; Tolle, A.
Archiv für Lebensmittelhygiene **25** (2) 26-32 (1974) [8 ref. De, en] [Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

The organization of the data bank of the Streptococci Centre established in 1964 at the Bundesanstalt für Milchforschung in Kiel using an existing Siemens programming system and the Siemens 4004/127 computer at Kiel is described. The data are in 3 sets: Streptococcus collection, Streptococcus facts, and Streptococcus literature. SKK

64

[Lactic acid fermentation of exhausted cossettes.]
Herman, A.; Kolanowski, T.
Gazeta Cukrownicza **81** (10) 260-266 (1973) [13 ref. Pl, ru, en, de]

The importance of inoculation of continuous diffusion cossettes with lactic acid bacteria is stressed. The inoculation protects the cossettes against undesirable fermentation and partial or complete loss of feeding value, and improves the flavour. The Polish firm CHEMADEX supplied Czechoslovakia with 2 sugar factories and 2 stations for continuous production of pure cultures of lactic acid bacteria. On the basis of good results obtained in these factories, CUKROPROJECT designed a station for cultivation of pure cultures of lactic acid bacteria to be gradually introduced into Polish sugar factories. Technological processes of operation in this station are described. The growth of bacteria is carried out in a medium consisting of molasses, superphosphate, ammonium sulphate, water and chalk. STI

65

[Preparation of concentrates of lactic acid bacteria for use in cheesemaking.]
Belova, G. A.; Klimovskii, I. I.; Krasheninin, P. F.
Molochnaya Promyshlennost' No. 11, 4-8 (1973) [11 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Cultures of Streptococcus lactis, Str. cremoris, Str. diacetilactis subsp. acetoinicus (strains of high- and low-acidifying capacity) and Str. paracitrovorus were grown at 30°C in a medium (initial pH 6.4-6.6) of clarified whey containing (per l.) 100 ml hydrolysed milk, 10 g sodium citrate, 10 ml yeast autolysate and 0.160 g manganese sulphate, with 1 or 2 neutralizations with food grade soda. The medium was cooled to ≤18°C, and the cells concentrated by centrifugation and suspended in 1-1.2 vol. of different substrates, e.g. (i) 10% sucrose solution, (ii) 10% sucrose solution with 5% sodium citrate, or (iii) 50% glycerine solution. Freeze-dried concentrates in substrate (i) contained 250×10^9-800×10^9 bacteria/g, and retained a satisfactory activity for 3 months at 5-8°C. During storage of the liquid preparations at 5-8°C the best results were obtained with substrates (ii) and (i), the respective decreases in total bacterial counts being 26 and 21% at 10 days; the preservation of aroma-producing bacteria was satisfactory for up to 20 days. At -8 to -11°C the survival of bacteria was satisfactory for up 30-45 days. It is concluded that best overall results were obtained with substrate (ii). FL

66

[Effect of UV rays and some other factors on lactic acid bacteria.]
Yankov, Ya.; Peeva, Yu.
Izvestiya, Nauchnoizsledovatelski Institut po Mlechna Promishlenost, Vidin 6, 129-137 (1972) [24 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

Cultures of Streptococcus lactis 797, Str. diacetilactis 117 and Lactobacillus casei 169 were exposed 1-3 × for 20, 40 or 60 s each time to UV radiation in the 250-300 nm range, or to bacteriostatic concn. of lindane (γ-BHC) or biomycin (chlortetracycline). Proteolytic capacity of Str. lactis and L. casein and diacetyl formation by Str. diacetilactis increased several fold after the different treatments but the microorganisms lost these acquired traits after subculturing 2-3 ×. It is concluded that the factors tested are of little value as mutagenic agents in increasing the biochemical activity of lactic acid bacteria. SKK

67

[Pesticide residues from viewpoint of milk processing.]
Cerna, M.
Prumysl Potravin 25 (1) 4-5 (1974) [20 ref. Cs] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

The author reviews literature data on the effects of pesticides on lactic acid bacteria and on the manufacture of some milk products; breakdown of pesticides (DDT, lindane) by microorganisms; and the influence of milk processing on the contents of pesticide residues. It is concluded that pesticide residues are very stable and their elimination from milk is difficult. FL

68

[Serological studies of bacteriophages. I. Production of antisera.]
Tsaneva, K.
Izvestiya, Nauchnoizsledovatelski Institut po Mlechna Promishlenost, Vidin 6, 139-143 (1972) [19 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

Sixty Streptococcus lactis bacteriophages isolated from different Bulgarian dairy factories were divided on their lytic properties into 8 groups using phage 235 from the Milk Industry Institute in Warsaw, Poland as control. 9 different rabbit antisera to the phage strains were prepared and the corresponding bacteriophages were divided by cross neutralization testing into 3 serological groups. There was no complete agreement between classification on lytic and serological properties. SKK

69

Studies on the inhibition of food-borne pathogens and spoilage bacteria by lactic acid starter cultures.
Daly, C.
Dissertation Abstracts International, B 33 (9) 4407-4408; Order no. 73-7823 (1973) [En] [Oregon St. Univ. Corvallis, 97331, USA]

Interactions of Streptococcus diacetilactis and certain food-borne pathogens were studied. When 3 commercial Lactacel starters were tested, during a 'simulated beaker sausage fermentation', for their ability to control growth of Staphylococcus aureus, all 3 gave >99% inhibition after 50 h at 30 or 37°C, and 97% after 50 h at 21°C. Acidification with 0.75% glucono-δ-lactone + 0.1% citric acid produced good initial control, but after 50 h inhibition was only slight, if any, at 30 and 37°C, and approx. 97% at 21°C. Starter culture + acidification gave approx. 99.99% inhibition after 50 h at all 3 temp. CDP

70

Lactic acid fermentation of soybean milk.
Wang, H. L.; Kraidej, L.; Hesseltine, C. W.
Journal of Milk and Food Technology 37 (2) 71-73 (1974) [8 ref. En] [N. Regional Res. Lab., USDA, Peoria, Illinois 61604, USA]

Growth rates of 8 Lactobacillus acidophilus strains and 4 L. bulgaricus strains were compared in soybean milk and soybean milk enriched with glucose, lactose, and sucrose. 4 L. acidophilus strains grew well in soybean milk; the remainder grew better in soybean milk supplemented with glucose or lactose. In general, soybean milk was not an adequate medium for strains of L. bulgaricus. Almost all these cultures, however, could adapt themselves to the environments of the media tested. A soybean milk drink fermented by L. acidophilus NRRL B-1910 was prepared and evaluated by a taste panel. The drink had a refreshing sweet-sour taste, and the beany flavour of soybeans was masked by the fermentation process. AS

71

[Lactic acid biosynthesis by lactic acid bacteria present in bran and wheat flour.]
Somfelean, N.; Chiran, Z.; Artenie, V.
Industria Alimentara 25 (3) 138-140 (1974) [7 ref. Ro, en, fr, de, ru] [Fabrica CIMP, Iasi, Romania]

Wheat bran and/or wheat flour in different proportions were incubated at 25° or 45°C with different quantities of distilled water, pressed yeast and NaCl, and lactic acid formation by the lactic acid bacteria naturally present in the wheat products was studied in the 9 variants of the experiment. Highest lactic acid yields ≤1500 mg/100 g mixture were obtained using 150 g each of bran and flour, 750 ml water and 12 g yeast, omitting the salt and incubating at 45°C. SKK

72

[Estimation of diacetyl in cultures.]
Shmeleva, L. I.; Yakovlev, D. A.; Ibragimova, A. Z.
Molochnaya Promyshlennost' No. 2, 21-23 (1974) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Zhirov, USSR]

Four methods of estimating diacetyl in lactic culture are compared. 3 are based on GLC of the head-space vapour, steam distillate and vacuum distillate respectively of the culture, the 4th on the colorimetric procedure of Pack et al. [Journal of Dairy Science (1964) 47 (9) 981-986]. In this procedure diacetyl, removed from the culture by a stream of N_2, is trapped in hydroxylamine with formation of dimethylglyoxime, which on reduction with ferrous sulphate yields a coloured complex. The GLC methods were found to be time consuming and insensitive, the colorimetric accurate, sensitive and sufficiently expeditious to serve for routine purposes. GTP

73

[Occurrence of Str. lactis bacteriophages in dairy factories.]
Tsaneva, K.
Khranitelna Promishlenost 22 (8/9) 27-29 (1973) [3 ref. Bg, ru, de, en] [Tsentralna Proizvodstvena Lab. po Mlechna Promishlenost, Bulgaria

By plating cell-free Seitz filtrates on hydrolysed milk agar, Streptococcus lactis bacteriophages in concn. between 11 and 195 particles/cm^3 were detected in 177 of 266 raw milk, cheese, whey, starter or air samples from 52 Bulgarian White pickled cheese factories, although only 78 of the samples came from factories with demonstrable faults due to phage infection. Highest % incidence of phages was in raw milk and in starters. There were marked regional differences, with highest incidence in the Plovdiv and Razgrad areas. Phages from factories with faults were generally more virulent than those from factories with normal production. There were no significant differences in incidence of Str. lactis phages between cheeses made with Str. lactis/Lactobacillus casei starter, a Str. thermophilus/L. bulgaricus yoghurt starter or a mixture of both starters, indicating that the yoghurt starter had no inhibitory effect on the phages. There was no difference in phage concn. between fresh cheeses and those stored for 6 months under refrigerated conditions. It is concluded that Str. lactis bacteriophages of varying degrees of virulence occur in cheese factories in all parts of Bulgaria (originating mainly from the raw milk), but do not always inhibit lactic acid fermentation. ADL

74

Component balance in mixed lactic starters as influenced by preservative procedures.
Reddy, M. S.; Vedamuthu, E. R.; Washam, C. J.; Reinbold, G. W.
Journal of Dairy Science 57 (1) 124-127 (1974) [11 ref. En] [Dept. of Food Tech., Iowa St. Univ., Ames 50010, USA]

Two strains of Streptococcus lactis, 4 of Str. cremoris and 5 of Str. diacetilactis were used to prepare 6 mixed cultures, each containing 1 strain of each sp. The mixed cultures were used to determine the relative efficiency of (i) freezing at -20°C, (ii) freeze-drying, and (iii) freezing at -196°C in liquid N_2 for maintaining the component strain balance during storage for 5 wk. All strains had been screened for compatability to eliminate the possibility of strain dominance. The Str. lactis:Str. cremoris:Str. diacetilactis ratios in 3 of the mixed cultures respectively after 1 transfer were: fresh culture, 36:28:36, 23:30:47 and 43:39:18; after (i) 25:55:20, 4:67:29 and 24:63:13; after (ii) 34:50:16, 11:59:30 and 20:60:20; and after (iii) 33:35:32, 24:40:36 and 43:35:22 Heterogeneity Chi-square tests on sjyese results gave values of 50.18, 26.07 possibility of strain dominance. The Str. lactis:Str. cremoris:Str. diacetilactis ratios in 3 of the mixed cultures respectively after 1 transfer were: fresh culture, 36:28:36, 23:30:47 and 43:39:18; after (i) 25:55:20, 4:67:29 and 24:63:13; after (ii) 34:50:16, 11:59:30 and 20:60:20; and after (iii) 33:35:32, 24:40:36 and 43:35:22 Heterogeneity Chi-square tests on sjyese results gave values of 50.18, 26.07 possibility of strain dominance. The Str. lactis:Str. cremoris:Str. diacetilactis ratios in 3 of the mixed cultures respectively after 1 transfer were: fresh culture, 36:28:36, 23:30:47 and 43:39:18; after (i) 25:55:20, 4:67:29 and 24:63:13; after (ii) 34:50:16, component balance of all (cultures' and also foq preserving aciducing activity= =[/~ =^{C}DP

75

[Experiments on production of active lactic cultures.]
Ghelmeziu, A.; Butnaru, I.
Industria Alimentara 24 (10) 561-562 (1973) [3 ref. Ro, en, fr, de, ru] [CIL, Serviciu Cercetari, Lab., Romania]

A cheese starter composed of many Streptococcus lactis strains was inoculated at 1% into sterile skim-milk containing 0.1% yeast extract and incubated at 30°C for up to 24 h. Log counts/ml and mean lactic acid concn. (%) respectively at various times during incubation were: after 5.5 h, 8.47 and 0.39; 6 h, 8.54 and 0.43; at coagulation, 8.81 and 0.49; 8 h, 8.70 and 0.40; 18 h, 8.54 and 0.35; and 24 h, 8.47 and 0.29. The acidifying ability [FSTA (1973) 5 1P11] of the cultures was closely correlated with Str. lactic counts and lactic acid concn. It is concluded that cultures should be incubated only until the coagulation point is reached. SKK

76

[Inhibition of Pseudomonas putrefaciens by Streptococcus diacetilactis and Leuconostoc citrovorum.]
Oliveira, J. S. de

Coletanea do Instituto de Tecnologia de Alimentos 3, 115-128 (1969/1970) [12 ref. Pt, en]

Tests on Ps. putrefaciens (isolated mainly from commercial butter showing proteolytic deterioration) showed that this organism was inhibited by citric or acetic acid in 2% solution at ≤pH 5.5, or by the presence of 7% salt in the nutrient medium. Supernatants from skim-milk cultures of Str. diacetilactis or L. citrovorum were particularly effective in inhibiting the organism at all pHs below 8.0. Addition of either culture to fresh salted or unsalted butter made from cream that had been inoculated with Ps. putrefaciens prevented proteolytic deterioration even after 90 days at 7°C, whereas untreated control samples showed proteolytic deterioration after 7-15 days. At 21°C this fault was found in the controls after only 2-4 days but not in the treated samples even after 15 days. Addition of 0.1% Str. diacetilactis or Leuc. citrovorum culture was sufficient to prevent proteolysis in butter made from cream containing 10^3 Ps. putrefaciens/ml, but at 2×10^4 Ps. putrefaciens/ml, 1% culture was required. ADL

77

Effect of diluent on bacterial counts in milk and milk products.

Keller, P.; Sklan, D.; Gordin, S.

Journal of Dairy Science 57 (1) 127-128 (1974) [3 ref. En] [Volcani Center, Bet Dagan, Israel]

Total bacterial counts of milk, buttermilk and zivda (milk coagulated with Streptococcus lactis) were determined using as diluents (i) phosphate buffered dilution water [distilled water, pH 7.2], (ii) 2% sodium citrate and (iii) 0.1% tryptone. Counts and % survival of bacteria after 0.5 and 2.5 h were higher ($P < 0.01$) in (iii) than in (i) or (ii). Counts were particularly low for buttermilk diluted with (i) and zivda diluted with (ii), being approx. 3 and 11% respectively of the counts with (iii). Str. lactic incubated for 2 h at 22°C in skim-milk and acidified skim-milk respectively showed 92 and 15% survival after 2.5 h in (i), 100 and 33% in (ii) and 92 and 100% in (iii). Corresponding figures for Escherichia coli were (i) 100 and 100, (ii) 98 and 96, and (iii) 97 and 80. It is concluded that (iii) is more suitable than (i) or (ii) as a diluent when determining total counts of acidified products. CDP

78

[Comparative study of culturing and storage of lactic acid bacteria. I. Culture media for lactic acid bacteria.]

Yankov, Ya.; Peeva, Yu.

Izvestiya, Nauchnoizsledovatelski Institut po Mlechna Promishlenost, Vidin 6, 113-120 (1972) [10 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

Streptococcus lactis 797 and Lactobacillus bulgaricus 58 were cultured in various media. Str. lactis grew best in whey medium with 3.5% sodium citrate and nearly as well in skim-milk with 5% yeast autolysate and 1% $CaCO_3$ (SY) or with 1% $CaCO_3$ alone (SC). L. bulgaricus grew best in SY, and grew well in SC which also preserved best the morphological characteristics of the cells. Highest counts of viable cells of both spp. were found after culturing for 72 h in media with $CaCO_3$ and these media are considered most suitable for culturing of lactic acid bacteria, in particularly lactobacilli. SKK

79

[Comparative study of culturing and storage of lactic acid bacteria. II. Storage of lactic acid bacteria under different conditions.]

Yankov, Ya.; Peeva, Yu

Izvestiya, Nauchnoizsledovatelski Institut po Mlechna Promishlenost, Vidin 6, 121-127 (1972) [12 ref. Bg, ru, en]

Streptococcus lactis 797, Str. cremoris 8, Lactobacillus casei 169, and L. bulgaricus 6 were cultured for 12 h in skim-milk (SM) or in the SY (with 3% yeast autolysate) or SC media described in the preceding abstr., and were then stored at +4° or -20°C or were freeze-dried. Streptococci and lactobacilli could be kept at +4°C in SY or SC media for up to 4 months, and in SM medium for up to 2 months; they could be kept in SM medium for up to 5 months at -20°C. Freeze-dried cultures could be kept for up to 12 months but L. bulgaricus showed marked morphological changes on subculturing in skim-milk after that period. SKK

80

[Studies on lactose-fermenting yeasts. XII. Volatile carbonyl compounds in the alcohol fermented skim-milk beverages.]

Nakanishi, T.; Arai, I.

Japanese Journal of Dairy Science [Rakuno Kagaku no Kenkyu] 22 (6) A221-A224 (1973) [6 ref. Ja, en] [Lab. of Animal Products Tech., Fac. of Agric., Tohoku Univ., Sendai]

Volatile carbonyl compounds (VCC) produced in skim-milk which had been inoculated with lactose-fermenting yeasts and/or lactic acid bacteria and incubated for 5-20 days at 30°C were determined by TLC. Acetaldehyde, acetone, butanone-2 and a component assumed to be β-ketobutyric acid were detected in all samples, but tended to be higher in skim-milk inoculated with Candida pseudotropicalis A60 or Torulopsis sphaerica J29 than in those inoculated with Lactobacillus bulgaricus B-1 or Streptococcus lactis 527. Skim-milks inoculated with a mixture of yeast + lactic acid bacteria tended to have the highest β-ketobutyric acid levels and levels of the other VCC were as follows: actaldehyde, 3.5-45 ppm; acetone, 0.8-16 ppm; and butanone-2, 0.2-5.7 ppm. [From En summ.] CDP

81

Role of enterococci in Cheddar cheese: growth of enterococci during manufacture and curing.
Jensen, J. P.; Reinbold, G. W.; Washam, C. J.; Vedamuthu, E. R.
Journal of Milk and Food Technology 36 (12) 613-618 (1973) [29 ref. En] [Dept. of Food Tech., Iowa St. Univ., Ames, 50010, USA]

Survival characteristics of starter streptococci during Cheddar cheese manufacture and ripening are variable from batch to batch. 2 strains of enterococci, Streptococcus faecalis and Str. durans were used in experimental cheese to supplement starters and give a more stable microbial population. Starter bacteria increased in numbers more rapidly than did the enterococci during manufacture but the population declined during pressing and ripening whereas enterococci maintained their numbers during pressing. Str. durans was more stable than Str. faecalis during ripening and both organisms survived better at 7.2° than at 12.8°C. BAL

82

Control of food-poisoning bacteria by irradiated Pedicoccus cerevisiae cells.
Al-Mashat, A. J. H.
Dissertation Abstracts International, B 33 (10) 4850: Order no. 73-8306 (1973) [En] [Univ. of California, Davis, USA]

Studies on control of food poisoning bacteria by acid production by irradiated P. cerevisiae cells (capable of acid production but incapable of cell division) are described. Details are given of effects of temp. on acid production by irradiated P. cerevisiae. The effects of P. cerevisiae on Staphylococcus aureus, Clostridium botulinum (A and B), Salmonella spp. and Clostridium perfringens in ground beef, ham and turkey meat were investigated. Results showed that irradiated P. cerevisiae effectively inhibited and often killed food poisoning bacteria in semi-preserved meat products containing 0-9% salt and with an initial pH ≤6.5, when the meat is exposed to room temp. or higher temp. AJDW

83

[Bifidus foods.]
Morinaga Milk Industries Co.
Japanese Patent 4 911 422 (1974) [Ja]

Refrigerated foods contain active Lactobacillus bifidus Bacillus, the bacteria being cultured to a particular stage and stored at low temp. IFT

84

[Malo-lactic fermentation in Rioja wines.]
Mata, J. B.; Redondo, A. L.
Semana Vitivinicola 28 (1386) 743, 745, 747 (1973) [Es]

Malo-lactic fermentation is desirable in Rioja wines as it is associated with reduced acidity and improved organoleptic quality; a review is given of the various factors which influence fermentation. These are primarily associated with geographical conditions of soils and climates, together with winemaking practices, of which details are given for distinct regions (Alta, Alavesa and Baja). The organism mainly responsible is a strain of Lactobacillus brevis (biochemical characteristics given). Soils of high pH and having poor contents of K and P are unfavourable; heavy K fertilization is recommended. During winemaking only slight aeration and min. use of SO_2 should be employed, with max. contact time between must and skins. Unfavourable chemical factors are high contents of alcohol, tartaric acid and tannins, while CO_2 and nitrogenous substances tend to be favourable. Certain yeast strains inhibit growth of the Lactobacillus. ELC

85

Stimulation of Leuconostoc oenos ML 34 by malo-lactic fermentation.
Pilone, G. J.; Kunkee, R. E.
Abstracts of the Annual Meeting of the American Society for Microbiology 72, 11 (1972) [En] [Univ. of California, Davis, USA]

Malo-lactic fermentation, a secondary fermentation often occurring in wine and caused by certain lactic acid bacteria, is puzzling since theoretically this decarboxylation of malic acid to lactic acid should be of no benefit to the organism. In studying the wine bacteria Leuconostoc oenos ML 34, it was found that malic acid fermentation brought about a slight but definite increase in cell mass. The extent of the increase was dependent upon amount of glucose fermented. Further evidence for interaction between glucose and malic acid fermentations was found in the greatly (3-fold) increased formation of D-lactic acid, the end product of glucose fermentation, in the presence of malic acid (over and above the lactic acid resulting from malic acid itself). Furthermore, a stimulation of growth rate (measured turbidimetrically) was found in the presence of malic acid. This stimulation was especially striking at pH 3.5, the pH of wine. None of the above effects was caused by the change in pH which accompanies malo-lactic fermentation. It was concluded that malo-lactic fermentation does indeed have a beneficial effect on the malo-lactic organism L. oenos ML 34, especially at low pH. AS

86

[Effect of some yeast strains on malolactic fermentation in red wines from Mavrud and Saperavi grapes.]
Bambalov, G.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 19 (3) 219-226 (1972) [12 ref. Bg, ru, en]

Tests were carried out on 25 strains of wine yeasts to determine their effect on malolactic fermentation in experimental Mavrud and Saperavi red wines, and on the viability of the lactic acid bacteria during alcoholic fermentation: fermentation was at 18°, 25° and 30°C. Sixteen of the strains totally inhibited malolactic fermentation in the Mavrud wine and 23 in the Saperavi; the inhibitory effect was particularly pronounced in the Mavrud wine at 30°C. The lactic acid bacteria count (130 000/ml initially) was rapidly reduced by presence of the yeast strains, the count ranging from 0 to 1350/ml after 6 days' alcoholic fermentation. HBr

87

Preservation of carrots by lactic acid fermentation.
Niketic-Aleksic, G. K.; Bourne, M. C.; Stamer, J. R.
Journal of Food Science 38 (1) 84-86 (1973) [13 ref. En] [New York St. Agric. Expt. Sta., Cornell Univ., Geneva, 14456, USA]

Whole, sliced and shredded Chantenay carrots were subjected to lactic acid fermentation in brines comprised of 1.5, 2.0, 2.5, 3.0% NaCl concn. One series was fermented by the naturally occurring microflora of the raw carrot and a second series was fermented by a mixed culture of homofermentative and heterofermentative lactic acid bacteria. Although the latter inocula significantly reduced the lag phase of early acid formation, all samples following 21 days incubation attained total acid values **>1%, expressed as lactic acid.** The volatile-to-nonvolatile acid ratios showed that the lactic acid fermentation of carrots arose as the result of a dominant homofermentative flora. Mild heat treatment of the high-acid product at 71°C produced no adverse changes in colour or texture. The resulting flavour of the fermented carrots was judged to be a pleasant composite of carrot, salt and acidic characteristics and most of the crisp texture of the raw carrot was retained. IFT

88

Sterilization of fruit products with diethyl pyrocarbonate.
Splittstoesser, D. F.
Abstracts of the Annual Meeting of the American Society for Microbiology 72, 18 (1972) [En] [Cornell Univ., New York St. Agric. Expt. Sta., Geneva, USA]

The effect of different variables on lethality of diethyl pyrocarbonate (DEPC) against a variety of organisms was studied. Different cell concn. exposed to a given level of DEPC yielded comparable % survivals indicating logarithmic death. The most sensitive test organisms, Saccharomyces cerevisiae, showed a reduction in viable count of >9 $\log_{10}$ cycles when exposed to 50 ppm DEPC. Ascospores of Byssochlamys fulva were most resistant; 200 ppm destroyed **<1 log. The temp.** maintained during treatment was important; e.g. 100 ppm reduced viable count of Aspergillus niger conidia 2.4 logs at 30°C compared to 4.7 logs at 40°C. Most destruction of Asp. niger and Sacc. cerevisiae occurred during the first 30 min of exposure. Lactobacillus plantarum required 4 h for max. destruction, a period when DEPC hydrolysis was complete. Studies on suspending menstrua suggest a repair mechanism may account for this lag. AS

89

DNA homology of sourdough Lactobacillus species.
Sriranganathan, N.; Seidler, R. J.; Sandine, W. E.; Elliker, P. R.
Abstracts of the Annual Meeting of the American Society for Microbiology 72, 59 (1972) [En] [Dept. of Microbiol., Oregon St. Univ., Corvallis, 97331, U3A]

Testing of 4 strains of lactobacilli isolated from sourdough for genetic homology and relatedness to known Lactobacillus spp. indicated that sourdough bacteria are unique and not related to any known lactic acid bacteria of comparable G C content. [See also FSTA (1974) 5 8M1098.] CDP

90

Microcalorimetry applied to certain species of bacteria growing in sterilized separated milk.
Berridge, N. J.; Cousins, C. M.; Cliffe, A. J.
Journal of Dairy Research 41 (2) 203-215 (1974) [13 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading, RG2 9AT, UK]

The heat produced/colony-forming unit (CFU) of growing bacteria was found to depend on the sp. and was greater the younger the culture. With the exception of 2 detn. out of 13 with 6 spp. [Bacillus cereus, Streptococcus cremoris, Pseudomonas sp., Escherichia coli I, Corynebacterium lacticum, Klebsiella aerogenes], the results showed that it should be possible to detect **$<5 \times 10^5$ CFU/ml by** the heat produced. A 7th sp., a micrococcus, could be detected at a lower level of CFU presumably because the unit was a clump of several cells. Gross variations which occurred with full-cream milk await investigation. AS

91

[Lactic cultures in goats' milk. Comparison with cows' milk.]

Portmann, A.; Pierre, A.
Revue Laitiere Francaise No. 312, 629, 631, 633, 636-637 (1973) [2 ref. Fr] [Lab. de Tech. Laitiere, INRA, 17700 Surgeres, France]

Goats' milk was tested raw, and after heat-treatment at 70, 75, 80 and 90°C for 15 min, as a growth medium both for a commercial lactic starter and for Streptococcus lactis C10. Cows' milk heated at 80°C was used as a reference. All 4 heat treatments destroyed coliforms, and the commercial starter and Str. lactis grew equally well at 25°C in either goats' or cows' milk. When goats' milk heated at 80°C for 15 min was inoculated at 1, 3 and 5% with commercial starter or Str. lactis, pH attained after 9 h at 25°C was similar with all 3 levels of inoculum; however, acidity development was more rapid with 3% than with 1% inoculum although 5% inoculum had little advantage over 3%. Acidity development maintained during 12 successive subcultures of 4 lactic starters in goats' milk was equal or superior to that maintained in cows' milk. CDP

92

[Methods for determining inhibitory substances in milk.]
Bester, B. H.; Lombard, S. H.
South African Journal of Dairy Technology 6 (1) 47-52 (1974) [15 ref. Af, en] [Dept. of Dairy Tech., Univ. of Pretoria, S. Africa]

TTC, resazurin, methylene blue, starter activity, standard disk assay and microscopical tests for inhibitory substances in milk were examined using Streptococcus thermophilus, Lactobacillus bulgaricus, Bacillus stearothermophilus sub-sp. calidolactis (C 953) and a commercial cheese starter as test organisms. The disk assay with C 953, and TTC test with a skim-milk culture of Str. thermophilus were the most sensitive to penicillin (sensitivity 0.005 IU/ml). Resazurin and methylene blue tests were fairly sensitive but results were inconsistent. The microscopic test was sensitive to 0.05-0.1 IU penicillin/ml. The cheese starter culture was less sensitive to penicillin than were the other organisms, but, when used in the starter activity test, was the most sensitive for detecting detergent/sterilizer residues; it detected (per l.) 10 mg hypochlorite, 40 mg iodophor and 10 and 50 mg quaternary ammonium compounds (QAC). The disk assay with C 953 was the most specific test for antibiotics residues, since with detergent/sterile **>1000 mg hypochlorite, >200 mg iodophor and >333 and >1000 mg QAC/l. were required to produce** inhibition zones. [From En summ.] CDP

93

Abstracts of papers to be presented at the Sixty-Ninth Annual Meeting. Manufacturing section. Microbiology.
United States of America, American Dairy Science Association
Journal of Dairy Science 57 (5) 579-583 (1974) [En]

The following papers are included in this section: Effect of cryoprotective agents on freeze-drying and storage of lactic cultures, by K. M. Shahani, A. Kilara, N. K. Das & W. R. Grace (M1); Effect of yeast extract on growth rate and acid production of Streptococcus lactis in reconstituted milk, by K. L. Smith, T. T. Toan & L. E. Mull (M2); Simultaneous loss of proteinase and lactose-utilizing enzyme activities on Streptococcus lactis C2 and reversal of less by transduction, by L. L. McKay & K. A. Baldwin (M3); Cellular location and activity of dipeptidases and proteinase enzymes of selected strains of lactic streptococci, by R. H. Schmidt, H. A. Morris & L. L. McKay (M4); Lactic acid production in milk precultured with psychrotrophic bacteria, by M. A. Cousin & E. H. Marth (M5); Bacteriophage-associated lysin produced by lactic streptococci, by C. Thunpithayakul & F. J. Babel (M6); Changes in the microflora of Parmesan cheese during its ripening, by T. L. Thompson & E. H. Marth (M7); Microbiology of naturally fermented bovine colostrum, by T. L. Thompson & E. H. Marth (M8); Streptococcus thermophilus bacteriophage in whey from Swiss and Italian cheese plants, by G. W. Reinbold & M. S. Reddy (M9); Associative growth of Streptococcus thermophilus and Lactobacillus bulgaricus in skim milk, by N. J. Moon & G. W. Reinbold (M10); Influence of bacteriophage on associative growth relationships among Streptococcus thermophilus, Lactobacillus, and Streptococcus lactis, by M. S. Reddy & G. W. Reinbold (M11); [continued in following abstr.] CDP

94

[The bacteriostatic activity of sodium benzoate at low temperature.] Über die bakteriostatische Wirkung von Na-Benzoat bei tieferen Temperaturen.
Scheer, H.
Informationen für die Fischwirtschaft 21 (2) 61-62 (1974) [De] [Inst. für Biochem. & Tech., Hamburg, Federal Republic of Germany]

In vitro studies on the inhibitory activity of sodium benzoate on Lactobacillus buchneri are described. Samples of nutrient media containing 3% NaCl, 0.3% vinegar and 0.2% sodium benzoate were inoculated with 97×10^3, 197×10^3 or 420×10^3 cells of L. buchneri/ml. No growth of the lactobacilli was observed during incubation for 4 months at 8-12°C; sterility test showed that the sodium benzoate was bacteriostatic, not bactericidal, under these conditions. Control samples of media without sodium benzoate showed

95

[Isolation and analysis of some strains of microorganism of potential use as bacterial starters in the production of Lukanka sausage.]
K'osev, D.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 16 (2) 227-236 (1969) [27 ref. Bg, ru, de]

The bacterial flora of typical Lukanka sausages was studied during traditional ripening. The total count increased rapidly in the early stages (10-fold) but then began to decrease. The predominant organisms were lactic acid bacteria, several spp. of which were isolated and studied as potential starters. A pure culture of 1 sp. (Lactobacillus plantarum L10) gave promising results in preliminary trials, showing a beneficial effects on the product's acidity, colour and consistency during ripening. HBr

96

[Volatile components in wine and other alcoholic beverages. IV. The influence of yeasts and lactobacilli on the content of volatile components in wine from exhausted wine yeast (yeast-wine).] Zur Kenntnis flüchtiger Inhaltsstoffe in Wein und anderen alkoholischen Getränken. IV. Der Einfluss von Hefen und Laktobazillen auf den Gehalt an flüchtigen Inhaltsstoffen in Hefenachwein.
Hieke, E.; Vollbrecht, D.
Chemie Mikrobiologie Technologie der Lebensmittel 3 (3) 65-68 (1974) [16 ref. De, en, fr] [Chem. Untersuchungsamt Rheinhessen, Mainz, Federal Republic of Germany]

Of 4 yeasts isolated from 3 samples of husks' wine and 1 of yeast wine, 3 were identified as Saccharomyces cerevisiae and the other as Rhodotorula rubra; 6 of 7 lactobacilli isolated were identified as L. brevis, the other as L. casei. Samples of yeast wine were fermented with the yeasts and/or lactobacilli, and the contents of volatile aroma constituents and ethanol were determined during 7 months' storage. With the yeasts alone, the content of ethyl acetate decreased from 13 mg/l. to trace amounts, but the other aroma constituents remained unchanged. With yeasts + lactobacilli, the original content of 1-propanol (22 mg/l.) doubled within 1 month; 2-butanol, not present originally, was found, while the content of ethanol dropped by 50% from its original level of 6.19 vol.%. The possible pathways of 1-propanol and 2-butanol synthesis are discussed. [Part III is to be published in Wein-Wissenschaft.] HBr

97

(1974) [Ru] [VNIIViV "Magarach", USSR]

Lactic acid bacteria affect wine and, conversely, wine composition affects the activity of lactic acid bacteria. The effect of acid on development of taxonometric groups was studied. The bacterial groups were identified by their different fermentation characters and their purity was also determined. Experiments were carried out with Lactobacillus brevis, L. buchneri, Leuconostoc gracile, L. plantarum and Pediococcus cerevisiae, using 2% solutions of sweet must with additions of malic acid to give pH of 2.7, 2.8, 3.0, 3.2, 3.4, 3.6, 3.8, and 4.0, and in wine to give pH of 2.8, 3.0, 3.2, and 3.4. The results showed that the most resistant organisms are heterofermentative cocci and homofermentative rods; heterofermentative rods appeared to have a lower resistance. The results are tabulated. STI

98

Streptococcus agalactiae in dairy herds. Its incidence and relationship to cell count and inhibitory substance levels in bulk milk.
Greer, D. O.; Pearson, J. K. L.
British Veterinary Journal 129 (6) 544-554 (1973) [13 ref. En, fr, de, es] [Min. of Agric., Vet. Res. Lab., Stormont, Belfast, UK]

In an examination of a total of 4221 composite milk samples taken at monthly intervals for 1 yr from 379 herds, Str. agalactiae was present in 12.3% of samples and 38.52% of herds. It was isolated only once from 34% of the positive herds, twice from 16% and 3 × from 8%; from only 1 herd was it isolated every month. Number of isolations was positively correlated ($r = 0.75$, $P < 0.01$) with mean somatic cell count. Only 20.7% of herds had mean cell counts of <300 000/ml and 60.7% had >1 million/ml. 73 samples contained inhibitory substances (≥0.05 IU/ml), which were all identified as penicillin; these penicillin-containing samples came from 15.57% of Str. agalactiae-positive and 12.45% of Str. agalactiae-negative herds. 9 Str. agalactiae isolates came from milk samples containing inhibitory substances. Peaks of Str. agalactiae incidence occurred in Nov. and July, whilst peaks for incidence of inhibitory substances occurred in Aug. and Jan. CDP

99

The lactic acid fermentation potential of nondairy imitation milks.
Kosikowski, F. V.; Jolly, R.
Milchwissenschaft 29 (1) 18-21 (1974) [9 ref. En, de] [Dept. of Food Sci., Cornell Univ., Ithaca, New York 14850, USA]

17 reconstituted non-dairy imitation milks (12% TS) were compared with reconstituted and fresh cows' milk for their ability to produce lactic acid fermented milk foods and to sustain growth of thermophilic and mesophilic starter bacteria. Reconstituted non-dairy imitation milks generally

coagulation time in the simulated production of yoghurt and Neufchatel cheese; these products did not compare favourably in flavour and texture with commercial products from fresh whole milk. Cheddar cheese could not be made from non-dairy imitation milks because of a lack of coagulation by rennet. 6 individual cultures [3 commercial lactic acid cultures, Lactobacillus bulgaricus, L. helveticus and Streptococcus thermophilus] grew appreciably slower in reconstituted non-dairy imitation milks than in reconstituted cows' milk controls. AS

100

[Effect of H_2O_2 on the development of Streptococcus thermophilus and Lactobacillus bulgaricus cultivated separately.]
Girginov, T.; Choroleeva, M.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 19 (3) 209-217 (1972) [3 ref. Bg, ru, en]

Addition of 0.005-0.01 ml H_2O_2 to yoghurt milk in 200-ml flasks, prior to pasteurization, cooling to approx. 45°C and inoculation with 2% Str. thermophilus or 2% L. bulgaricus, was found to have a stimulating effect on the growth of both organisms, reducing the coagulation time from 5 h 30 min to around 5 h for Str. thermophilus and from 7 h to 5 h 10 min for L. bulgaricus. If >0.01 ml H_2O_2 was added, the coagulation time increased with increasing H_2O_2 content; with 0.1 ml H_2O_2, the coagulation time for Str. thermophilus was longer than for the controls without H_2O_2. If H_2O_2 was added after pasteurization of the milk, the coagulation time for both organisms was longer than for the controls even at the 0.005-ml level. The variations observed in the activity of the organisms as expressed by the coagulation time were associated with morphological changes observed by microscopic study. [See also FSTA (1973) 5 11P1570.] ADL

101

Isolation of nisin-producing streptococci by a plating technique using Micrococcus flavus.
Kalra, M. S.; Dudani, A. T.
Indian Journal of Dairy Science 26 (3) 208-209 (1973) [6 ref. En] [Nat. Dairy Res. Inst., Karnal]

Serial dilution of the test sample are plated on Nisin Assay agar (1% peptone, 0.3% beef extract, 0.15% yeast extract, 0.3% NaCl, 0.1% brown sugar and 1.5% agar, pH 7.5) seeded with a suspension of M. flavus. After incubation at 22°C for 24-48 h, nisin-producing colonies are surrounded by clear zones. Using this technique, 14 nisin-producing streptococci were isolated from 120 cows' milk samples, 35 from 50 buffaloes' milk, 1 from 20 goats' milk, and 9 from 50 market dahi samples. Nisin production by these isolates ranged from 125 to 1500 RU/ml in skim-milk and from 125 to 1000 RU/ml in yeast dextrose broth after 16 h at 30°C. CDP

102

Production of ethyl esters by some lactic acid and psychrotrophic bacteria.
Hosono, A.; Elliott, J. A.; McGugan, W. A.
Journal of Dairy Science 57 (5) 535-539 (1974) [11 ref. En] [Food Res. Inst., Canada Dept. of Agric., Ottawa]

The production of esterases by 5 strains of lactic acid bacteria (Streptococcus diacetilactis ATCC 15346, Str. lactis ML3, Str. cremoris TR, Lactobacillus No. 81, and L. casei L323) and 2 strains of psychrotrophic bacteria belonging to the genus Pseudomonas (strains 50 and 53) were studied. All strains contained esterase capable of esterification of butyric and caproic acids with ethanol. Production of these was very weak in strains TR and L323. In lactic acid bacteria, production of ethyl butyrate was higher than ethyl hexanoate. The psychrotrophic bacteria produced much higher amounts of the enzymes. Production of enzyme by the lactic acid bacteria was markedly suppressed upon incubation under N_2 whereas strains 50 and 53 showed increased production under N_2. Production of enzyme by all the strains was markedly affected by pH of the medium [optimum initial pH was 6 or 7 for lactic acid bacteria and 8 for the psychrotrophs]. , AS

103

[Study of respiration in X-ray induced mutant strains of some lactic acid bacteria.]
Makaryan, K. V.; Kharutyunyan, R. K.
Biologicheskii Zhurnal Armenii 26 (7) 44-47 (1973) [5 ref. Ru, am] [Erevanskii Zooveterinarnyi Inst., Problemnaya Lab. Molochnogo Dela, Sektor Radiobiologii MZ ArmSSR, USSR]

104

[The synthesis of flavour substances by lactic acid Streptococci.]
Akopyan, L. G.; Erzinkyan, L. A.
Biologicheskii Zhurnal Armenii 26 (4) 43-48 (1973) [14 ref. Am, ru]

Synthesis of diacetyl and acetoin was studied in 44 strains of Streptococcus diacetilactis, and of acetylmethylcarbinol in 30 strains of Str. lactis, 30 strains of Str. diacetilactis and 155 strains of Str. thermophilus. From the results it is concluded that amounts of diacetyl and acetoin produced generally increased with increase of titratable acidity and with time of fermentation, but decreased following prolonged storage of cultures (16-72 h). Acetylmethylcarbinol may be synthesized by different strains from glucose, sodium citrate, lactose or their mixtures. STI

105

[Mycotoxins, autochthonic agents inhibiting milk fermentation.]
Bacic, B.; Jovic, R.; Borota, M.; Milin, S.
Mljekarstvo 24 (1) 6-9 (1974) [6 ref. Sh] [Poljoprivredni Fak., Novi Sad, Yugoslavia]

Inhibition of Lactobacillus bulgaricus fermentation of milk from individual producers is ascribed to presence in it of Aspergillus fumigatus mycotoxins derived from mouldy sugar beet pulp fed to cows. SKK

106

[Effect of some fungicides on lactic acid bacteria.]
Über die Wirkung einiger Fungicide auf Milchsäurebakterien.
Radler, F.; Schönig, I.
Wein-Wissenschaft 29 (4) 181-187 (1974) [7 ref. De] [Inst. für Mikrobiol. und Weinforschung, Johannes-Gutenberg-Univ., Mainz, Federal Republic of Germany]

Details are given of studies on inhibition of various lactic acid bacteria isolated from grapes and wine (Lactobacillus casei, L. plantarum, L. brevis, Pediococcus cerevisiae, P. pentosaceus, Leuconostoc oenos, Leuconostoc mesenteroides) by the fungicides Bavistin, Benomyl, Cercobin, Dithane Ultra, Euparen, Basfungin, Ortho-phaltan and Mycodifol. Inhibition by various concn. of the fungicides was evaluated by means of auxanographic tests and studies on acid production by cultures in MRS [De Man, Rogosa and Sharpe] medium. The results showed that the fungicides differed considerably in inhibitory activity; however, the tests frequently gave contradictory results. The bacteria differed markedly in fungicide resistance. The fungicide concn. required for inhibition of the bacteria were higher than either those present in wine or musts or those required for inhibition of yeasts. It is concluded that, in the event of inhibition of the yeast by fungicide residues, there is a danger of growth of lactic acid bacteria in the must or wine. AJDW

107

[New knowledge of microbiological and cellar technique for biological destruction of acidity.]
Mikrobiologisch und kellertechnisch wichtige neue Erkenntnisse in bezug auf den biologischen Säureabbau. [Lecture]
Mayer, K.
Schweizerische Zeitschrift für Obst- und Weinbau 11 (12) 291-297 (1974) [De] [Eidgenössische Forschungsanstalt, Wädenswil, Switzerland]

This lecture is concerned mainly with problems of excessive acidity in wines produced in colder areas of Europe and the means of achieving a reduction by controlled malo-lactic fermentation. The characteristics and possible uses of various lactic organisms are reviewed, with special reference to spp. of Lactobacillus and Leuconostoc, and to Pediococcus cerevisiae. Control of fermentation conditions to achieve the desired biological environment is discussed with reference to pH, temp., careful use of SO_2, and possible applications of 'double salt' (acidex) treatment and atm. of various mixtures of air, CO_2 and N in relation to individual microbiological spp. ELC

108

Excretion and incidence of antibiotics in milk.
Abo-Elnaga, I. G.; Abdel-Mottaleb, L.; Mahmoud, M.
Indian Journal of Dairy Science 26 (3) 203-205 (1973) [5 ref. En] [Dairy Dept., Fac. of Agric., Assiut Univ., United Arab Republic]

One udder quarter each of 4 cows and 3 buffaloes was injected with an average of 300 mg oxytetracycline in a preparation containing 30 mg oxytetracycline hydrochloride/g stable liquid solution. Milk samples collected at each of the 10 milkings following infusion showed that 88.1 and 78.7% of the residual antibiotic appeared in the first 2 milkings of cows and buffaloes respectively. Antibiotic excretion period was longer in buffaloes than in cows (average 10 vs. 8 milkings) and was inversely related to milk yield (5 days for a low-yielding buffalo vs. 3 days for a high yielding one). 1.58% of 441 raw milk samples from various localities contained antibiotics at 0.01-0.024 IU/ml, i.e. at levels sufficient to completely or partially suppress growth of lactic streptococci. CDP

109

[Frozen concentrated suspensions of lactic acid bacteria.]
Comis, N.
Industria Alimentara 25 (4) 197-198, 211 (1974) [5 ref. Ro] [Ind. Laptelui, Bacau, Rumania]

This is primarily a description of the procedure for preparation of frozen conc. suspensions of lactic acid bacteria developed at the Station Centrale de Recherches Laitieres et de Technologie des Produits Animaux in Jouy-en-Josas, France [See, e.g. Accolas ° Auclair, Lait (1967) 47 (465/466) 253-260]. SKK

110

[Effect of aeration on acidity development in milk by lactic cultures.]
Blais, A.; Desautels, C.; Martin, C.; Samson, R.; Giroux, R. N.
Quebec Laitier et Alimentaire 33 (3/4/5) 6-7 (1974) [Fr] [Div. Tech., Cooperative Agric. de Granby, Quebec, Canada]

After incubation for 15 h at 21°C, titratable acidity of 54 starter cultures ranged from 54 to 118°D when incubated aerobically in shake culture, and from 85 to 128°D when incubated anaerobically. The difference in acidity after aerobic and anaerobic incubation varied

considerably between individual cultures; aeration had no effect on acid production of 4 cultures, but considerably inhibited acid production (by ≥40°D) in 2 butter and 2 cheese starters. Results are discussed in relation to aeration during cheese manufacture. CDP

111

Proteolytic activity of Streptococcus lactis C10 in natural milk system.
Rawat, R. S.; Choudhery, A. K.; Mikolajcik, E. M.
Indian Journal of Dairy Science **27** (1) 29-34 (1974) [15 ref. En] [Dept. of Dairy Tech., Ohio St. Univ., Columbus, USA]

Using polyacrylamide gel electrophoresis, it was shown that the proteose-peptone fraction of milk protein was the most susceptible to proteolysis by Str. lactis C10. No significant proteolysis of other milk proteins occurred during 15 days incubation at 30°C of milk inoculated with Str. lactis C10, and presence of this organism inhibited the action of native milk proteases on α_s- and β-casein; this inhibitory action was probably due to production of lactic acid by Str. lactis C10. CDP

112

Utilisation of paneer whey for the preparation of flavour concentrate.
Lal, M.; Tiwari, M. P.; Nambudripad, V. K. N.
Indian Journal of Dairy Science **27** (1) 78-80 (1974) [11 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

Paneer whey, which contains approx. 0.5% citrate, was adjusted to pH 5 and tested, with and without various supplements, as a medium for growth of and diacetyl production by Streptococcus B [see FSTA (1973) 5 8P1078]. Production of diacetyl was max. in whey + 2% sodium citrate + 0.5% yeast extract + 1% tryptone (930 and 1200 ppm after 48 and 72 h respectively at 30°C), but only 88% of the citrate was utilized; utilization of citrate was max. (95%) when the whey was supplemented with 1% glucose. CDP

113

Relation between acid production and β-galactosidase activity of cells of Lactobacillus jugurti.
Cupolo, L. del; Grazia, L.; Tonini, L.
Scienza e Tecnologia degli Alimenti **4** (1) 49-52 (1974) [21 ref. It, en] [Istituto di Microbiologia, Univ., Bologna, Italy]

β-galactosidase activity, and acidity production in milk and in a micro-inoculum broth containing lactose were estimated for each of 60 strains of L. jugart isolated from whey starters for Parmesan cheese. There were no correlations between the 3 measurements so they may be used in the differentiation of strains. JMD

114

Sausage curing.
Everson, C. W.; Danner, W. E.; Hammes, P. A. (Merck & Co. Inc.)
United States Patent 3 814 817 (1974) [En]

An improved process is described for preparing dry and semi-dry sausages using Lactobacillus plantarum NRRL-B-5461 either alone or with other lactic acid producing microorganisms. IFT

115

[Radiation preservation of Vienna sausage. II. Effect of gamma irradiation on the microflora.]
Ito, H.; Kume, T.; Sato, T.
Food Irradiation [Shokuhin-Shosha] 7 (1) 50-56 (1972) [5 ref. Ja, en] [Japan Atomic Energy Res. Inst., Takasaki Radiation Chem. Res. Establishment, Japan]

The effect of γ-ray irradiation on the microflora of Vienna sausages was investigated. Species which grew in commercial sausages during storage at 10°C were Lactobacillus, Streptococcus, Micrococcus and yeasts. In sausage containing no preservative, Lactobacillus, Streptococcus, Micrococcus, Bacillus and yeast predominated on storage at 10°C. Irradiation of sausages at 300 and 500 krad destroyed all microorganisms except Lactobacillus, Streptococcus and yeasts. The number of microorganisms on sausages packed in N_2 did not increase for 6-7 days after irradiation (300 krad). When irradiated with 500 krad, the number of microorganisms did not increase for 12-14 days at 10°C. The presence of Acinetobacter considerably decreased the shelf-life. AS

116

[Nutrient medium suitable for counting and isolation of lactic acid bacteria.]
Deak, T.
Konzerv-es Paprikaipar No. 5, 167-170 (1973) [54 ref. Hu, ru, de] [Kerteszeti Egyetem, Budapest, Hungary]

The newly developed medium, named Lacto-agar, contains (per l.) 10 g 'Tripkazin', trypticase or tryptone, 5 g yeast extract, 10 g glucose, 8 g $CaCO_3$, 0.7 g potassium sorbate, 2 ml of a 1.5% aqueous solution of bromocresol green and 25 g agar. The medium is ready for use after sterilization for 20 min at 115°C. Experiments proved the good selectivity and differentiating capacity of this medium, which can also be used as a growth medium for lactic acid bacteria. IF

117

[An antiseptic against bacterial contamination in the brewing industry.]
Mogileva, V. M.
Prikladnaya Biokhimiya i Mikrobiologiya [illegible]

issled. Inst. Pivo-Bezalkogol'noi Promyshlennosti, USSR]

Preliminary experiments showed that a 0.35% solution of ammonium persulphate (AP) at pH 3.5 was bactericidal for coliforms, lactobacilli, pediococci and sarcinae isolated from yeast cultures but had no effect on sporeformers. A brewery strain of Saccharomyces carlsbergensis treated with AP under the conditions stated retained in full its viability and activity; and use of AP is recommended to enable repeated use of yeast cultures in brewing. SKK

118

[Study of the microflora of raw cane sugar throughout the manufacturing process.]
Duarte, E.; Valdes, I.; Paz, L.; Negrete, M.
Revista sobre los Derivados de la Cana Azucar **8** (1) 37-50 (1974) [10 ref. Es, en]

[Contd. from preceding abstr.] During clarification and filtration, heating of limed juice greatly reduced total numbers with further removal in the clarifier mud, but numbers increased again considerably in filtered juice and filter cake. Slight increases in total numbers and osmophilic yeasts occurred during sugar boiling. Major spp. throughout were Bacillus subtilis, B. cereus and Leuconostoc spp. ELC

119

[Study of lactic fermentation in dough.]
Terlaga, M.
Przeglad Piekarski i Cukierniczy **22** (2) 28-31 (1974) [12 ref. Pl]

Rye dough fermentation occurs spontaneously due to the presence of lactic acid bacteria (40% of the total are Lactobacillus plantarum and 25% L. brevis). The lactic acid produced decrease the pH of the dough and inhibits the development of coliforms. During fermentation, organic acids other than lactic acid are produced. These were identified by paper chromatography. Paper chromatography also permits rapid colorimetric identification of lactic acid. STI

120

[Lactic acid bacteria of raw milk White pickled cheese.]
Chomakov, Kh.; Kirov, N.
Izvestiya, Nauchnoizsledovatelski Institut po Mlechna Promishlenost, Vidin **7**, 171-190 (1973) [35 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

White pickled cheeses made by the customary Bulgarian procedure from raw ewes' milk or raw cows' milk, were examined 1, 4, 7, 15, 30, 60 and 90 days after manufacture for total and lactic acid bacteria counts. In the raw cows' milk, Lactobacillus plantarum and forms intermediate between L. plantarum and L. casei predominated among the lactic acid bacteria, but L. casei strains were also present. In raw ewes' milk, L. plantarum and L. casei represented the homofermentative spp., and L. brevis represented the heterofermentative ones. In ripening cows' milk cheeses, L. plantarum was the main species during the 1st month, and L. casei predominated thereafter. In ripening ewes' milk cheeses, L. plantarum predominated during the 1st month; L. casei attained parity with it during the 2nd month, and predominated at 3 months. SKK

121

[Consumption and accumulation of free amino acids during milk fermentation by lactic acid streptococci.]
Ibragimova, A. Z.; Novotel'nov, N. V.; Shmeleva, L. I.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 6, 67-69 (1973) [2 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, USSR]

The spectrum of free amino acids formed by the action of starter cultures used for milk fermentation in margarine manufacture was studied. The starter contained Streptococcus lactis, Str. cremoris and Str. diacetilactis. Free amino acids were determined in sterile milk following the addition of 2% of starter and incubation for 3, 6 and 24 h at 30°C. Ion exchange chromatography was used together with an automatic analyser. During intensive growth and multiplication of the microorganisms a drop in the free amino acids content was observed. Later the amount of free amino acids increased. It is recommended that starter cultures should be selected for both aroma-producing activity and ability to accumulate free amino acids. STI

122

[Effect of rancid milk on souring.]
Bitsch, F.; Holmskov, P.
Maelkeritidende **87** (32) 876-883 (1974) [18 ref. Da] [Kgl. Veterinaer- of Landbohojskole, Copenhagen, Denmark]

In experiments to determine the effect of lipolytic rancidity on souring, milk was heated to 42°C, homogenized at 130 kg/cm^2 (to promote lipolysis), cooled to 5°C and then, after approx. 60 h, mixed with non-homogenized milk in 9 different ratios ranging from 100:0 to 0:100 (fat acidity corresponding to 0.59-24.62 ml 1N KOH/100 g fat). Three 200-ml samples from each mixture were then pasteurized, inoculated with 1% of either Hansens' mixed starter, Streptococcus lactis or Str. cremoris, incubated at 21°C and titrated with 0.1N NaOH and phenolphthalein after 0, 3, 6, 10, 15 and 20 h. Results showed that all 3 cultures were inhibited for 15-20 h by the rancid milk, even at low acidity (about 1 ml/100 g). In similar experiments in which corresponding levels of acidity were produced by direct addition of free fatty acids in ethanol solution to the milk, it was

found that the cultures were inhibited only at higher acidity levels (1.63-4.77 ml/100 g), suggesting that inhibition was due to other factors (e.g. mono- and diglycerides) as well as to free fatty acids. ADL

123

An agar medium for the differential enumeration of yogurt starter bacteria.
Lee, S. Y.; Vedamuthu, E. R.; Washam, C. J.; Reinbold, G. W.
Journal of Milk and Food Technology **37** (5) 272-276 (1974) [21 ref. En] [Dept. of Food Tech., Iowa St. Univ., Ames, 50010, USA]

An agar medium (Lee's medium) developed for differential enumeration of Streptococcus thermophilus and Lactobacillus bulgaricus in yoghurt starters is based on the ability of the streptococcus but not the lactobacillus to ferment sucrose. The medium contains sucrose, lactose, bromocresol purple, tryptone, yeast extract, $CaCO_3$ and K_2HPO_4; the streptococcus utilizes both sugars and produces sufficient acid to change the indicator colour and form yellow colonies, whilst the lactobacillus generally grows more slowly, produces less acid and yields white colonies. Acid diffusion around the Str. thermophilus colonies can be minimized by incorporation of $CaCO_3$ in the medium. Using this medium it was shown that a 6-h joint culture of Str. thermophilus D and L. bulgaricus in milk could be satisfactorily frozen and stored in liquid N_2, but that there was a considerable loss of viability of the streptococcus when a 12-h culture was frozen and stored in liquid N_2. It is suggested that Lee's agar could be used in the quality control of freshly-prepared yoghurt starters, but that it has certain limitations which preclude its general application for differential enumeration of the 2 organisms. CDP

124

[Effects of starter quantity and ripening temperature on cream.]
Lazauskas, V.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti **8**, 173-176 (1973) [8 ref. Ru, li, en] [Vil'nius, USSR]

Buttermaking cream (33-35% fat) of 14-15°T titratable acidity was pasteurized at 93-95°C and ripened for 15-16 h at 15°, 18° or 21°C with 3, 5 or 10% Kaunas starter (3-4 strains of Streptococcus lactis, 3-4 strains of Str. cremoris and 1-2 strains of diacetyl-forming Str. diacetilactis); and (i) titratable acidity, (ii) pH, and contents of (iii) diacetyl, (iv) volatile fatty acids and (v) lactic acid bacteria were determined. (i), (ii) and (iv) were not particularly affected by temp., though (iv) values were slightly higher at 21°C. With increase in starter addition, production of (iii) and (iv) increased; (i) and (ii) did not alter appreciably, and contents of (v) decreased. Highest (iii) contents (0.4-0.5 mg/100 ml) were obtained at 15-18°C with 10% starter. SKK

125

[Distribution of bacteriophages in cheese production.]
Berzhymunas [Berziunas], Z.; Sukhotskene [Suchockiene], I.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti 8, 169-172 (1973) [7 ref. Ru, li, en] [Vil'nius, USSR]

31 strains of Streptococcus lactis, 23 of Str. cremoris, 20 of Str. diacetilactis and 8 of Str. paracitrovorus were isolated from a small cheese starter of the All Union Research Institute of the Milk and Cheese Industry at Uglich. Phages isolated by the Lithuanian Branch of the Institute at Vil'nius during cheese production using the Kaunas starter were tested against the Uglich streptococcal strains. The % lysed were, in the order of species listed above, 35.5, 30.4, 12.5 and 50. Of the 72 phage strains isolated, 35 were obtained from raw milk, 18 from whey, 12 from cheese, 5 from cheese milk, and 2 from pasteurized milk; no bacteriophage was isolated from the starter. SKK

126

[Species composition and characteristics of mesophilic lactic streptococci of Dutch cheese in the early stage of ripening.]
Sukhotskene [Suchockiene], I.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti 8, 183-188 (1973) [11 ref. Ru, li, en] [Litovskii Filial Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Vil'nius, USSR]

Dutch type cheeses manufactured in Lithuanian SSR factories using Baltic-type starter were examined after ripening for 3-7 days. 125 strains of mesophilic lactic streptococci isolated from the cheeses were identified as Streptococcus cremoris, 52%, Str. diacetilactis, 31%, Str. lactis, 16% and Str. paracitrovorus, 1%. Most strains were characterized by a growth temp. of 8°C; several Str. lactis strains failed to grow at 40°C. SKK

127

[Study of preolytic activity of mesophilic lactic streptococci.]
Sukhotskene, I. [Suchockiene, J.]; Talachkene [Talackiene], R.; Matulite [Matulyte], A.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti 8, 189-196 (1973) [10 ref. Ru, li, en]

The proteolytic activity was examined of 526 strains of mesophilic lactic streptococci isolated from vegetation, milk, commercial smetana, ripened-cream butter, and Dutch-type cheeses [see preceding abstr.]. According to quantity of tyrosine and tryptophan produced during culturing in milk

25°C for 7 days, the strains were classified on proteolytic activity as: (i) very weak (≤0.5 mg/1oo ml), 13.7% of strains; (ii) weak (0.5-3 mg/100 ml), 51.9%; (iii) medium (3-6 mg/100 ml), 19.9%; (iv) strong (6.9 mg/100 ml), 8.8%; and (v) very strong (>9 mg/100 ml); 5.7%. The % of (i) + (ii) categories among species were: Streptococcus lactis, 52; Str. cremoris, 71; Str. diacetilactis, 67; and Str. paracitrovorus, 100. Activity distributions among the different species isolated from each source are tabulated. Max. proteolytic activities of the 4 species in the order quoted above were 13.3, 10.9, 4.2 and 2.7 mg/100 ml respectively. SKK

128

Concentration and persistence of antibiotics in milk following intramammary infusion in cows.
Ziv, G.; Gordin, S.; Bachar, G.; Bernstein, S.
Refuah Verinarith 30 (3/4) 56-59, 85-100 (1973) [15 ref. En, He] [Kimron Vet. Inst., Bet Dagan, Israel]

Use of 16 antibiotics preparations was studied in a herd of 140 lactating Israeli-Friesian cows which were milked 3× daily in a 2-unit 2-stall tandem parlour. Each product was administered as a single infusion to 2 cows and as 2 infusions with a 24-h interval to a 3rd cow. Decline in antibiotics levels in milk after 2 infusions was generally similar to that observed after a single infusion. Max. time during which the antibiotic persisted in the milk ranged from 32 h for chloramphenicol and 36 h for erythromycin to ≥144 h for a spiramycin-containing product (Specia 273 V). Residues generally persisted in the milk for >96 h after infusion of products containing streptomycin. Antibiotics activity was detected in milk from untreated quarters of cows treated with 14 of the preparations. Min. concn. of various antibiotics necessary in milk to inhibit fermentation by 2 Streptococcus thermophilus starters ranged from 0.0005 µg spiramycin to 25 µg furaltadone/ml for 1 culture and from 0.005 µg furaltadone for the other. CDP

129

[Possibilities of producing butter aromatized with butter starter distillate. I.]
Konfortov, A.
Khranitelna Promishlenost 21 (3) 34-35 (1972) [14 ref. Bg]

5 types of butter starter tested, that obtained from Hansen Lab., Copenhagen, gave the best flavour and diacetyl volatile acids ratio. It was found that this starter could be cultured with equal success in whole milk, skim-milk, untreated whey or deproteinized whey. Addition to the starter of ≥0.5 citrate (disodium citrate and citric acid) increased diacetyl, acetoin and volatile acids production. Addition also of 1-7% of a Leuconostoc citrovorum culture increased the production particularly of diacetyl and acetoin and accelerated citrate fermentation. In further experiments, (i) 0.6% [illegible]

culture were added to pasteurized skim-milk before culturing at 23/10, 23, 27 or 30°C, and (ii) 0.6% citric acid was added to a 24-h skim-milk culture of L. citrovorum before culturing at the same temp.; the optimum diacetyl- acetoin/volatile acids ratio was achieved with variant (ii), after 20-24 h culturing at 30°C. STI

130

[Possibilities of producing butter aromatized with butter starter distillate. II.]
Konfortov, A.
Khranitelna Promishlenost 21 (4) 31-33 (1972) [12 ref. Bg]

Boiling, steam distillation and vacuum distillation in an air stream were tested as methods of distilling aroma compounds from butter starter with 0.5% disodium citrate and Leuconostoc citrovorum culture with 0.6% citric acid (pH 4.3), cultured for 24 h at 30°C [see preceding abstr.]. A 20% solution of $FeCl_3$, mixed in a 3:1 ratio with the starter, was used to oxidize acetoin to diacetyl. All 3 methods tested were found suitable for extracting diacetyl but unsuitable for separating the volatile acids. The best method was steam distillation. In further tests on this method with starters produced in whole milk, skim-milk, untreated whey or deproteinized whey, the distillate with the best aroma was that from deproteinized whey starter; the distillates had a coarse aroma due to the combined effect of Fe ions and temp. on milk fats, proteins and phospholipids. A 2-step method, involving first 20% and then (after addition of $FeCl_3$) 30% distillation, gave a distillate with a good aroma, especially from the whey starters, and is recommended as the most suitable method. ADL

131

Factors affecting the quality of Domiati cheese. I. Effect of heat treatment.
Naguib, M. M.; El-Sadek, G. M.; Naguib, K.
Egyptian Journal of Dairy Science 2 (1) 55-73 (1974) [31 ref. En, ar] [Food & Dairy Res. Lab, Nat. Res. Centre, Ain-Shams Univ., Cairo, Egypt]

Domiati cheese was successfully made from milk pasteurized at 85° and 72°C for 15 min and was analysed at intervals during 3 months. The pasteurized milk cheese contained more moisture, lactose, salt and total N and had a higher pH than did the raw milk cheese. These values were proportional to the severity of heat treatment. More acidity and proteolysis developed in the raw milk cheese during pickling. Raw milk cheese had higher bacterial counts than the pasteurized milk cheese during the first month of pickling. Thereafter, both cheeses had similar counts. Total and lactic acid bacteril counts increased to a max. at the 7th day and then gradually decreased. Streptococci behaved similarly but disappeared at the second and third months. Lactobacilli reached a max. count at the 15th day in raw milk cheese and

at the first month in the pasteurized. Counts of the non-lactic acid bacteria showed a steady decreased during pickling. It is recommended that cheese be made from milk pasteurized at 72°C for 15 s rather than at 85°C for 15 s. AS

132

[Selective medium for the isolation of milk bacteria belonging to the genera Streptococcus and Leuconostoc: milk gel with nalidixic acid.]
Catteau, M.; Beerens, H.; Roelofsen, M.
Annales de l'Institut Pasteur de Lille **22**, 381-385 (1971) [5 ref. Fr, en] [CERBA, Inst. Pasteur de Lille, France]

The medium tested (VLLN medium) has the following composition/l.: 10 g tryptic peptone, 5 g NaCl, 2 g meat extract, 5 g yeast extract, 0.3 g cysteine hydrochloride, 0.04 g nalidixic acid, 2 g glucose and 15 g agar; 2 ml sterile skim-milk are added to 20 ml molten agar prior to pouring the plates, and after inoculation of the plates they are incubated at 30°C for 48 h. The VLLN medium compared favourably with Chalmer's medium using collection strains of Streptococcus spp. and Leuconostoc citrovorum, and gave good results when used to isolate these organisms from fresh cheeses, particularly when Gram-negative or Bacillus spp. were also present. However, colonies were more difficult to differentiate on VLLN than on Chalmer's medium. CDP

133

[Regulatory systems for enzymes in cells.]
Bolcato, V.
Scienza e Tecnologia degli Alimenti **3** (3) 141-144 (1973) [21 ref. It, en] [Istituto di Chimica Agraria e Industrie Agrarie, Univ., Padua, Italy]

Enzyme regulation by end-product inhibition as well as control of synthesis by repression and induction are reviewed. Preliminary observations on cheese ripening suggest that amino acids repress the synthesis of endocellular proteases in penicillia of Gorgonzola and in some lactic acid bacteria, and that extracellular proteases of penicillia are probably under dual control, with induction by amino acids and repression by catabolism. JMD

134

Associative growth among lactic acid bacteria in the presence of homo and heterologous bacteriophages.
Kothari, S. L.; Nambudripad, V. K. N.
Indian Journal of Dairy Science **26** (4) 225-231 (1973) [20 ref. En] [Dairy Microbiol. Div., Nat. Dairy Res. Inst., Karnal, India]

Lactic acid production by associated cultures of Streptococcus cremoris strains KH + R_6 and HC + R_6 at 30°C was slightly higher when the pairs of strains were maintained and transferred together than when they were mixed just before inoculation. Acid production by strain KH was reduced in the presence of $>10^6$ particles of the heterologous phage r_6, whereas presence of $>10^6$ particles of phage kh enhanced possibly because of the presence of a growth promoting metabolite for R_6 in the phage preparation. Strain HC was not affected by the presence of either phage kh or r_6. Since bacteriophage r_6 rarely occurs naturally, the associated culture of KH + R_6 is recommended for use in a rotation system for cheese manufacture. Enhanced acid production by R_6 grown in association with phage-resistant strain KH-I was only slightly lower than that of R_6 + KH; it clotted milk in 6.5 h vs. 6 h. CDP

135

Properties of a fermented, semidry turkey sausage during production with lyophilized and frozen concentrates of Pediococcus cerevisiae.
Keller, J. E.; Acton, J. C.
Journal of Food Science **39** (4) 836-840 (1974) [29 ref. En] [Dept. of Food Sci., Clemson Univ., S. Carolina 29631, USA]

Turkey sausage mixes utilizing breast, thigh and skin tissues were inoculated with either lyophilized or frozen concentrate starter cultures of P. cerevisiae. Main phases of production were examined to determine where and at what rate compositional, microbial and physical changes occur. Fermentation of sausages was more rapid with frozen concentrate (6-8 h lag phase) than with lyophilized culture (12-14 h lag phase), as determined by rates of pH reduction and lactic acid production. Sausage meat water-holding capacity during fermentation using either culture form showed a min. at pH 5.0, the approximate isoelectric point of major muscle proteins. During heat processing to 71°C internally, counts of total viable bacteria and lactic acid bacteria were reduced by 5 log cycles. Changes in concn. of chemical components (protein, fat, moisture, salt) and shear force values during the drying phase were highly correlated with the amount of shrinkage and moisture removed. A semidry product was attained in 10-12 days. IFT

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FAB 31

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H. BROOKES

ASSISTANT EDITOR

1

[Effect of Laktotsid on a pure-culture mixture of lactic acid bacteria.]
Slyusarenko, T. P.; Shvets, V. N.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 156-157 (1973) [4 ref. Ru] [Kievskii Tekhnologicheskii Inst. Pishchevoi Promyshlennosti, Kiev, USSR]

Leuconostoc mesenteroides, Leuc. dextranicum, Streptococcus lactis, Str. faecalis, Lactobacillus plantarum, L. brevis, L. pastorianus, L. fermenti, L. leichmannii and L. buchneri, isolated from contaminated molasses, were introduced into sterile 22% molasses solutions (pH 5.0-5.2) at 200 000/ml. Alcoholic suspensions of Laktotsid (an antibiotic prepared from actinomycete strain 135/1) corresponding to 0.01-0.075% of dried mycelium were added to the solutions which were then incubated for 10 days at 30°C and examined at intervals. Laktotsid was bactericidal for the lactic acid bacteria at 0.02-0.075% in terms of mycelium. SKK

2

[The acid-forming capacity of lactic acid bacteria.]
Vitavskaya, A. V.; El'tsova, O. P.; Zainullina, G. Kh.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 3, 21-23 (1974) [Ru] [Kazgipropishcheprom, USSR]

The ability of mesophilic lactic acid bacteria from flour to form acids in a starter was examined. Under specific conditions of cultivation (35-37°C for 8 h) lactic acid bacteria in 2nd-grade wheat flour dough showed considerable acid forming activity, which resulted in production of lactic acid and, to a lesser extent, of volatile acids. STI

3

[Growth of Lactobacillus bifidus cultures in cows' milk.]
Ziajka, S.; Kisza, J.; Roskosz, D.
Zeszyty Naukowe Akademii Rolniczo-Technicznej w Olsztynie No. 121, Technologia Zywnosci 3, 171-178 (1974) [11 ref. Pl, ru, en] [Inst. Inzynierii i Biotech. Zywnosci, ART, Olsztyn, Poland]

A study was made of the growth of 5 L. bifidus strains in (i) cows' milk alone, (ii) cows' milk + 20% pepsin-digested milk and (iii) cows' milk + 2% lactulose syrup. Titratable acidity, lactose content, non-protein N and peptide N were determined after 12, 24, 36 and 48 h anaerobic incubation at 37°C, as well as bacterial cell counts after 24 h. Most strains showed max. growth in (ii), counts ranging from 1.6×10^8 to 1.6×10^9, vs. 8.7×10^7 to 1.4×10^9 in (i) and 8×10^7 to 1.8×10^9 in (iii). Acid production was also greatest in (ii). Of the 5 strains studied, strain J showed the highest activity. ADC

4

[Proteolytic activity of lactic acid bacteria.]
Ter-Kazar'yan, S. Sh.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 1, 67-69 (1974) [21 ref. Ru] [Erevanskii Zooveterinarnyi Inst., USSR]

Proteolytic activity of streptococci was only about half that of the lactobacilli; Streptococcus faecalis accumulated on average 7 mg% of amino N, Lactobacillus plantarum 13.6 mg%, and L. caucasium 16.3 mg%. The coeff. of variation was on average 67, but often exceeded 100. No statistically significant relationship was found between strain or spp. and proteolytic activity; when selecting strains for use in the cheese industry, the individual properties of each strain should be considered. STI

5

Non-acid milk - the reappearance of an old problem.
Pearce, L. E.; Sage, N. F.; Hastings, J.
New Zealand Journal of Dairy Science and Technology 8 (4) 165-166 (1973) [2 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Cheesemaking failure at 2 factories due to excessive counts of nisin-producing streptococci in the cheese milk was traced in each case to a refrigeration unit breakdown on one farm supplying the factory. The streptococci had multiplied to such an extent that even mixing with a vol. of normal milk to give approx. 100-fold dilution still left an nisin concn. inhibitory to the cheese starter. The nisin-producing organism in both cases was a strain of Streptococcus lactis. CDP

6

[Microbiological evaluations of yoghurt in connection with storage times and temperatures.]
Lusiani, G.; Salvadori, P.; Bianchi-Salvadori, B.
Lait 54 (531/532) 53-59 (1974) [2 ref. Fr, en]

The average acidity (% lactic acid) of 120 samples of normal yoghurt (with 3.5% fat) was initially lower than that of 160 low-fat samples (with 1% fat), but levels were similar (1.45%) after 20 days at 5°C; acidity of 50 samples with 7% fat was always lower than that of the other samples, max. values being approx. 1.3% after 30 days. Increases in acidity of fruit yoghurts approximated those of normal yoghurt. All types of yoghurt (including fruit yoghurts) still contained $>10^7$ viable lactic acid bacteria after 40 days at 5°C. In low fat yoghurt held at 22 and 30°C respectively, counts of viable lactic acid bacteria declined to $<10^5$ after 16 and 8 days. It is concluded that yoghurt has a shelf life of approx. 1 month if stored continuously at refrigeration temp. CDP

7

[Variations in the contents of free amino acids, histamine and tyramine in ripened sausage (salami).]
Cantoni, C.; Bianchi, M. A.; Beretta, G.
Industrie Alimentari **13** (7/8) 75-78 (1974) [11 ref. It] [Istituto Ispozione Alimenti Animali, Univ. di Milano, Italy]

Samples of Varzi and Campagnolo var. salami were analysed after mixing of the ingredients and after 15-60 days maturation. In the Varzi var. there was a steady increase in the content of free amino acids, from 0.662 g/100 g on mixing to 1.949 g/100 g after 60 days. The histamine content increased from 0.46 to 2.98 g/100 g (dry wt.) and the tyramine content from 0 to 73 g/100 g during the same period. In the Campagnolo var. the total free amino acids increased from 1.227 g/100 g on mixing to 1.670 g/100 after 30 days, but then declined slightly to 1.643 g/100 g after 60 days. The histamine content rose from 0.36 to 3.54 g/100 g and the typical changes in the microflora over the period involved, viz. the change from a predominance of micrococci initially to one of lactobacilli later. HBr

8

[Popolation growth rates of live lactic acid bacteria during wine-making and storage.]
Martiniere, P.; Sapis, J.-C.; Ribereau-Gayon, J.
Comptes Rendus Hebdomadaires des Seances de l'Academie d'Agriculture de France **60** (4) 255-261 (1974) [Fr] [Inst. d'Oenologie de Bordeaux, INRA, France]

The effects of sulphitation and heating on the malo-lactic fermentation of wine were studied. 4 batches of wine were made from unheated grapes, (i) with or (ii) without 50 mg/l. SO_2 added before fermentation, and from grapes heated at 60°C, (iii) with or (iv) without 50 mg/l. SO_2. Counts of live bacteria were made during fermentation up to the point of decline of lactic fermentation. Time periods (days) for (i), (ii), (iii), (iv) respectively were: start of increase in numbers of bacteria 19, 30, 19, 27; max. rate of increase 27, 41, 27, 41; cessation of increase 34, 64, 34, 64; start of lactic fermentation 34, 34, 27, 41; completion of lactic fermentation 55, 77, 55, 111; duration 22, 43, 28, 70. Comparisons between (i) and (ii) and (iii) and (iv) showed that sulphitation delayed the growth of lactic bacteria. Heating at 60°C had only a minor effect. RM

9

[Heat treatment of molasses.]
Shvets', V. M.; Slyusarenko, T. P.; Privan, V. M.; Kravets', V. I.; Romanyukov, N. V.
Kharchova Promislovist' (Naukovo-virobnichii Zbirnik) No. 2, 39-42 (1973) [5 ref. Uk] [Kiivskii Tekh. Inst. Kharchovoi Promislovosti, USSR]

A study of optimum conditions for sterilization of molasses highly infected with heat-resistant lactic acid and spore-forming bacteria showed that sterilization at temp. <100°C was generally insufficient, while longer sterilization at temp. >100°C caused pronounced decomposition, considerable losses of sugar and formation of substances which inhibited the growth of yeasts. Optimum results were given by short-time sterilization at temp. >100°C, preferably sterilization for 5 min at 120°C with vacuum cooling to remove undesirable volatile contaminants. However, in practice, sterilization was economically efficient and advisable only for molasses highly infected with lactic acid and spore-forming bacteria; in other cases the resulting effects were negligible. Consequently, microbiological analysis should always precede the decision on whether or not molasses should be sterilized. A detailed description of equipment for continuous sterilization of highly infected molasses is given. STI

10

[Changes in gluten during production of wheat bread with brewery yeast.]
Vedrnikova, E. I.; Linetskaya, G. N.; Pavlyuk, R. Yu.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 4, 14-16 (1974) [Ru]

Pressed brewery yeast is noted for its exceptional microbiological purity, and gives intensive alcohol fermentation but slow lactic fermentation. A study was made of the extent to which these properties affect proteins in dough. It was found that the accumulation of dissolved N_2 proceeds at a slower rate than with bakery yeast, which prolongs the dough ripening period. With methods employing brewery yeast, it is recommended that additions be made of preparations which accelerate lactic fermentation. STI

11

[Proteolytic action of lactic streptococci. II. Action of the proteolytic system of Streptococcus lactis on whole casein.
Kikuchi, T.; Bergere, J.-L.; Desmazeaud, M.-J.
Annales de Biologie Animale, Biochimie, Biophysique **14** (2) 313-326 (1974) [29 ref. Fr, en] [Tech. Res. Inst., Snow-Brand Milk Products Co., Ltd. 27-1, 3-Chome, Akabanekita, Kita-ku, Tokyo, Japan]

Ultrasonically-treated cell suspensions of Streptococcus lactis CNRZ 261 exhibited max. proteolytic activity towards whole casein at a temp. of 30°C and a pH of 7.0. The proteolytic enzymes were associated mainly with the cell debris and were not released by lysozyme treatment. After incubation of whole casein with the Str. lactic cell suspension at 30°C for 50 h at pH 6.0, only 12-13% of the N was soluble at pH 4.6 or in 2 or 12%

trichloroacetic acid. Since 65% of this soluble N was also soluble in phosphotungatic acid it appeared to be mainly composed of amino acids and small peptides. This was confirmed by gel filtration analysis. Only 16% of the soluble N fraction had a mol. wt. of >1000 Dalton. Paper chromatographic and electrophoretic analysis showed that the main amino acids present were: serine, glycine, valine, leucine, isoleucine and proline, with smaller amounts of aspartic acid, threonine, methionine, phenylalanine and tyrosine. The proteolytic system of Str. lactic appears to be composed of peptides and proteases with narrow specificity. The importance of proteolytic streptococci in the ripening of cheese is stressed. [For part I see FSTA **6**, 3P378.] MEG

12

[Bacteriology of Emmental cheese manufacture.]
Bakteriologie der Emmentalerkäserei.
Münch, S.
Deutsche Molkerei-Zeitung **95** (39) 1414-1419 (1974) [De] [Staatliche Milchwirtschaftliche Lehr- und Forschungsanstalt, Dr. Oskar-Farny-Inst., Wangen im Allgäu, Federal Republic of Germany]

In this lecture, presented at a meeting at Dr. Anton-Fehr School, Teaching and Research Institute for Emmental Cheesemaking, Weiler, in Sept. 1974, the author deals with bacterial flora of raw milk (species generally present and those (Streptococcus thermophilus and Lactobacillus helveticus) of particular importance to Emmental cheese manufacture), starters, and tropical bacteriological problems of Emmental cheese production. FL

13

The effect of rennet on starter activity.
Pearce, L. E.
New Zealand Journal of Dairy Science and Technology **9** (1) 16-17 (1974) [3 ref. En] [New Zealand Res. Inst., Palmerston North, New Zealand]

Activity of 20 Streptococcus cremoris and 8 Str. lactis starter strains was generally stimulated by proteolytic enzymes present in commercial rennet. Results varied with source and type of milk; however, a 3-fold increase in rennet concn. over that normally used in cheesemaking did not produce any additional stimulation, and 10- and 30-fold increases caused slight inhibition. It is suggested that the stimulatory effect of rennet on starter activity may be related to its gelling properties. The stimulatory effect of rennet is not significant in practice. CDP

14

[Protein changes and amino acid liberation caused by lactic acid bacteria used in yoghurt manufacture.]
Luca, C.
Industria Alimentara **25** (6) 291-293 (1974) [5 ref. Ro, en, fr, de, ru] [Inst. Politehnic Galati, Rumania]

2 strains of (i) Lactobacillus bulgaricus and a strain of (ii) Streptococcus thermophilus used in production of yoghurt starters were tested. 100-ml samples of milk sterilized for 15 min at 110°C and inoculated with 1% of a culture of 1 of the (i) strains or of the (ii) strain, or with 2% of a culture of the 2nd (i) strain were incubated at 40° or, for (ii) at 37-38°C for ≤7 days and contents of free amino acids were determined at intervals. Both (i) strains caused considerable liberation of amino acids, final values being 10-25 × higher than the initial, and each strain producing a specific pattern of liberation. The proteolytic activity of (ii) was very low, and final values for contents of free amino acids were lower than the initial values. SKK

15

Fermentation of whole egg by heterofermentative streptococci.
Galluzzo, S. J.; Cotterill, O. J.; Marshall, R. T.
Poultry Science **53** (4) 1575-1584 (1974) [24 ref. En] [Dept. of Food Sci. & Nutr., Univ., Columbia, Missouri 65201, USA]

Growth and diacetyl production of heterofermentative streptococci in liquid whole egg (WE) were investigated. Three mixed-strain lactic cultures, a Streptococcus diacetilactis culture, and two Leuconostoc species did not grow well in pasteurized (60°C for 3.5 min) WE with or without added yeast extract. Lowering the pH and/or additional heating of the WE enhanced growth. S. diacetilactis grew in pasteurized WE when pH was reduced to 6.5 or below. Both superheating (65°C for 20 min) the WE and pH adjustment were necessary for good growth of the other cultures. S. diacetilactis produced most diacetyl in WE acidified to pH 5.5 with citric acid. Peak concentrations of 9 ppm were noted after 8 h of fermentation at 21.5°C. A "buttery" aroma was readily apparent. Diacetyl concentrations were low and varied in WE acidified with citric acid, when inoculated with mixed-strain cultures. Leuconostoc cultures produced a mild fermented odour without diacetyl. When lactic acid was used for pH adjustment, the mixed strain cultures and S. diacetilactis produced a "metallic" off-odour which increased with fermentation time. It was possible to simultaneously desugar WE and impart flavours and/or aromas characteristic of dairy products by fermentation with S. diacetilactis. However, growth of a bacillus contaminate during fermentation was a problem. AS

16

[History and present state of Soviet nomenclature of lactic acid bacteria.]
Ter-Kazar'yan, S. Sh.
Biologicheskii Zhurnal Armenii **25** (8) 98 (1972) [101 ref. Ru] [Erevanskii Zoovet. Inst., USSR]

This is an abstr. of a historical study of the names given to lactic acid bacteria in Soviet scientific

literature. It is pointed out that many names have not persisted, but for certain species there are still several names. In some cases the terms used are erroneous (e.g. Lactobacterium instead of Lactobacillus). The term 'streptococcus' is often erroneously accompanied by the epithet 'lactic acid'. There are also inaccuracies in explanations of the derivation of certain names (e.g. Betacoccus not as '2nd coccus' but as 'coccus isolated from beet'). Russian terminology is rarely used in published material and lectures. The original article is accompanied by a Concise historical Russian-Latin glossary of taxonomic names of lactic acid bacteria, and by a Draft glossary of names of lactic acid bacteria under contemporary identification schemes. ADL

17

[Formation of 2-butanol by lactobacilli and yeasts.]
Zur Bildung von Butanol-2 durch Lactobacillen und Hefen.
Hieke, E.; Vollbrecht, D.
Archives of Microbiology **99** (4) 345-351 (1974) [15 ref. De, en] [Chem. Untersuchungsamt, Rheinhessen, Mainz, Federal Republic of Germany]

18

[Studies on phenol related compounds inhibiting the growth of lactic acid bacteria. I. Substances in green tea inhibiting the growth of lactic acid bacteria.]
Nisiyama, R.; Kozaki, M.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **48** (2) 83-89 (1974) [13 ref. Ja, en] [Tokyo Metropolitan Agric. Senior High School, Tokyo, Japan]

Growth of Leuconostoc mesenteroides P-60 (Leuc. P-60) and other lactic acid bacteria was inhibited by aqueous extract of tea leaves. On the other hand, extracts of >21 spp. of higher plant had no inhibitory effect on the growth of Leuc. P-60. The dialysate, but not dialysed residue, showed inhibitory effect. Active factors were extracted by ethyl-acetate or n-butanol from an acidic aqueous solution at pH 2, and the absorption spectra of the active fractions resembled those of polyphenols. AS

19

Growth of lactic acid bacteria in soy milks.
Mital, B. K.; Steinkraus, K. H.; Naylor, H. B.
Journal of Food Science **39** (5) 1018-1022 (1974) [39 ref. En] [Cornell Univ., New York St. Agric. Expt. Sta., Geneva, 14456, USA]

Selected lactic acid bacteria were studied for their growth characteristics in soybean milks and their ability to utilize carbohydrates (predominantly sucrose) present in soybeans and soybean products. Results showed that lactic acid bacteria such as Streptococcus thermophilus, Lactobacillus acidophilus, L. cellobiosus and L. plantarum, which are able to utilize sucrose, could be employed in the manufacture of fermented soy milk products. IFT

20

[Content of volatile fatty acids in Dutch brick cheese in relation to bacterial composition of starter.]
Belousov, A. P.; Shalygina, A. M.; Krylova, V. P.
Molochnaya Promyshlennost' No. 9, 9-11 (1974) [9 ref. Ru] [Ukrainskii Nauchno-issled. Inst. Myasnoi i Molochnoi Promyshelennosti, USSR]

The effect of the composition of the starter on organoleptic characteristics, and ripening of Dutch brick cheese was studied using 5 experimental starters in comparison to a control starter, employing (with 1 exception) a standard manufacturing procedure. The mixed strain starters were composed of various combination of Streptococcus cremoris and Str. lactis, Str. diacetilactis, Str. paracitrovorus, and in 1 case also of Str. acetoinicus. Contents and proportions of butyric, propionic and acetic acids and acids with ≥5 carbon atoms are tabulated for the cheeses at 75 and 180 days. Four (including the standard control) of the 6 starters gave cheese a good flavour and aroma. Reducing scalding temp. to 34°C resulted in considerable increases in acetic acid content and in improvement of flavour characteristics of the cheese. FL

21

[Lactic acid bacteria counts in yoghurts.]
Battistotti, B.; Bottazzi, V.
Scienza e Tecnica Lattiero-Casearia **25** (3) 120-129 (1974) [18 ref. It, en] [Istituto di Microbiologia Lattiero-Casearia Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

Counts of lactic acid bacteria in natural and fruit yoghurts were, in general, much higher when made on whey agar than on FAN (phytone/acetate/nystatin) medium recommended for the purpose. [Negri et al., Produrre Bene e Igienicamente (1971) No. 23, 356]. Whey agar counts were probably incomplete, however, owing to the differing requirements of the various organisms, certain of which, for instance, grew only in the neighbourhood of yeast colonies. The coagulative capacity of the organisms of various commercial yoghurts, as tested by 24-h incubation at 42°C in sterilized milk, could not be related to plate counts of the parent yoghurts. Plate counts thus appear to posses only limited significance and to provide no real index in the microbiological evaluation of yoghurt. GTP

22

[Method for producing a balanced, viable culture of Lactobacillus bulgaricus and Streptococcus thermophilus in dried form.]
Anderson, L. (Wenner Gren Medical Laboratory AB)

Swedish Patent Application 369 470 (1974) [Sv]

A dried yoghurt culture containing Lactobacillus bulgaricus and Streptococcus thermophilus in a ratio of 40:60 to 60:40 is obtained by first growing the bacteria in preferably conc. skim-milk (DM18-24%) to which 0.5-5.0 mg cyanocobalamine and preferably also 50-500 g lysine and/or 10-1000 g cystine/100 l. skim-milk have been added. This method permits drying the culture at preferably 75-80°C (as opposed to the conventional drying temp. of 60-65°C) without altering the balance of bacteria in the dry product. W&Co

23

Activation of lipolytic activity in Streptococcus lactis by ultraviolet irradiation.

Chander, H.; Kuila, R. K.; Ranganathan, B.

Acta Microbiologica Polonica, B **6** (3) 139-140 (1974) [4 ref. En] [Dept. of Microbiol., Nat. Dairy Res. Inst., Karnal, India]

The possibility of obtaining lipolytic mutants from Str. lactis was investigated, since such mutants would have practical significance in cheese ripening. A suspension of weakly lipolytic Str. lactis S1 in phosphate buffer was subjected to UV irradiation at 900 to 9000 ergs/mm^2 under conditions described previously [Kuila et al., FSTA (1971) 3 7P1221]. Mutants with increased lipolytic activity were isolated after irradiation at 7200 ergs/mm^2, at which level there was <1% survival of Str. lactis; the mutants formed clearance zones of 7-9 mm on tributyrin agar after 48 h vs. zones of 3-5 mm around parent colonies. When assayed for lipolytic activity by the method of Susuma et al. [Agricultural and Biological Chemistry (1967) **31**, 1357] using butter oil as substrate, the mutants showed an average of 66% more lipolytic activity than the parent strain after 24 h and 100% after 48 h. CDP

24

Selecting lysine-excreting mutants of lactobacilli for use in food and feed enrichment.

Sands, D. C.; Hankin, L.

Applied Microbiology **28** (3) 523-524 (1974) [5 ref. En] [Dept. of Plant Pathol. & Biochem., Connecticut Agric. Expt. Sta., New Haven, Connecticut 06504, USA]

Lysine-excreting mutants of Lactobacillus plantarum were selected using paper disks impregnated with the lysine analogue S-2-aminoethyl-L-cysteine; the analogue inhibited growth of the wild-type but this inhibition was eliminated by L-lysine at approx. 0.2M. By gradually increasing the amount of analogue to 5 mg/disk, mutants were selected that excreted 72 μg lysine/ml. These mutants produced a higher lysine level (0.63%) than the wild type (0.45%) when inoculated into maize silage, whilst similar mutants of L. bulgaricus were used to increase the lysine content of fermented soya bean milk from 4 to 14%. It is considered that these mutants could also be used in the manufacture of products such as yoghurt, sour cream, buttermilk and sauerkraut, and yeast mutants could be used in brewing. CDP

25

[Fermentation development and histamine production during sauerkraut manufacture.]

Gärverlauf und Histaminbildung bei der Sauerkrauterzeugung.

Mayer, K.; Pause, G.; Vetsch, U.

Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene **65** (2) 234-238 (1974) [9 ref. De, fr, en] [Eidgenössisches Forschungsanstalt für Obst-, Wein- und Gartenbau, Wädenswil, Switzerland]

Attempts were made to determine pH-values, total acid and histamine contents as well as changes in the bacterial flora in two containers of fermenting sauerkraut. Simultaneously with the appearance of lactic acid cocci (Pediococcus cerevisiae) the histamine contents increased; after 10 wk histamine levels of 160 mg/kg were found. The addition of 1 ppm manganese had no influence on the fermentation velocity. AS

26

[Active cultures of lactic acid bacteria for preparation of thin fermenting liquid.]

Kazanskaya, L. N.; Afanas'eva, O. V.; Gurina, O. F.; Vasil'eva, A. I.

Khlebopekarnaya i Konditerskaya Promyshlennost' No. 6, 15-17 (1974) [Ru] [Leningradskoe Otdelenie Vses. Nauchno-issled. Inst. Khlebopekarnoi Promyhlennosti, USSR]

Well-established industrial strains of lactic bacteria are currently used in the preparation of rye flour ferments. Isolation, selection and study of new strains of lactic bacteria is reported. Out of 100 isolated and typed cultures, 17 active strains were selected, including Lactobacillus brevis-1, Lact. casei-26, Lact. plantarum-30 etc. These are much more active than the strains in present use, in particular the homofermenting group comprising Lact. casei-26 and Lact. plantarum-30. Dough made with fermenting liquid containing the new strains contains more lactic bacteria, and the bread has a better taste and flavour, with a dry, elastic crumb. The newly isolated strains show promise for the manufacture of rye and wheat-rye bread, using liquid preparations containing 75-85% moisture. STI

27

Release of intracellular streptococcal dipeptidase during Cheddar cheese maturation. [Conference proceedings]

Law, B. A.; Sharpe, M. E.

XIX International Dairy Congress **1E**, 346-347 (1974) [2 ref. En] [Nat. Inst. for Res. in Dairying, Reading, Berks, UK]

As starter count declined in maturing Cheddar

cheese, total (intra- and extracellular) dipeptidase activity increased to 3-4 × that in the curd; this was due to increase in the intracellular enzyme at a rate proportional to decline in the starter population Total and intracellular enzyme levels began to decrease after 2-3 wk when approx. 90% of the starter had died out. CDP

28

Studies on nisin-resistant strains of bacteria. [Conference proceedings]
Lipinska, E.
XIX International Dairy Congress **1E**, 394-395 (1974) [4 ref. En] [Inst. of the Dairy Ind., Warsaw, Poland]

Nisin-resistant (P) strains of Streptococcus lactis $2a_3$ and Propionibacterium shermanii 1296 had lower cell DM contents and higher fermentative activities at some growth stages than had corresponding normal (K) strains. The P stain of Str. lactis produced more diacetyl (1.70 vs. 0.56 mg/l.), acetoin (5.8 vs. 5 mg/l.) and CO_2 (120 vs. 87 mg/l.) and was more proteolytic than the K strain. [see Lipinska, "Studies on nisin-resistant strains of Streptococcus lactis and Propionibacterium shermanii". (1974) 80pp. Instytut Przemyslu Mleczarskiego, Warsaw, Poland]. CDP

29

Lactic acid configuration of various strains of lactic acid bacteria as a function of production conditions. [Conference proceedings]
Steffen, C.; Nick, B.; Blanc, B. H.
XIX International Dairy Congress **1E**, 404-406 (1974) [2 ref. En] [Fed. Dairy Res. Sta., Liebefeld-Berne, Switzerland]

Enzymic determination of L(+) and D(-) lactic acid, as described in FSTA (1972) **4** 3P346, showed that the L(+)/D(-) ratio in cultured milk products was dependent on the lactic acid bacteria used for the culture, and was not influenced to any extent by time and temp. of incubation, pH or nutrient composition. CDP

30

The hydrolytic effect of enzymes of certain lactic acid bacteria on casein substrates. [Conference proceedings]
Groman, K.
XIX International Dairy Congress **1E**, 348-349 (1974) [En] [Inst. of the Dairy Ind., Warsaw, Poland]

Changes in casein caused by heating to 72°, 95° or 120°C influenced the course of proteolysis by enzymic extracts of Streptococcus lactis T_1, Str. cremoris T_{155} and Lactobacillus casei T_{50}. The enzymes to be used in various reactions should therefore be selected both for the substrate used and the heat treatment applied to that substrate. CDP

31

Intensified growth of Bifidobacterium bifidum (Lactobacillus bifidus). [Conference proceedings]
Kisza, J.; Ziajka, S.; Panfil, H.
XIX International Dairy Congress **1E**, 578 (1974) [En] [Inst. of Food Eng. and Biotech., Univ. of Agric., Olsztyn, Poland]

4 strains of B. bifidum were grown in semicountinuous culture at controlled pH 5.6-6.2 on media containing mineral salts, p-aminobenzoic acid and undigested whey, whey, whey + whey proteins, whey proteins or skim-milk, each digested with pepsin. Cell yields were highest on media containing pepsin-digested whey or skim-milk. Fermentative and proteolytic activity increased with cell numbers. Cell yields using semi-continuous culture were 5 to 10× greater than those obtained using the same vol. of medium in batch culture. [See also FSTA (1974) **6** 6P873]. MJL

32

Effect of carbon dioxide on the growth of lactobacilli in tryptone glucose yeast extract agar. [Conference proceedings]
Kanbe, M.
XIX International Dairy Congress **1E**, 391 (1974) [En] [Res. Inst., Meiji Milk Products Co. Ltd., Tokyo, Japan]

Lactobacilli were grown on tryptone/glucose/yeast extract agar plates anaerobically under CO_2 (in a jar containing iron wool soaked in cupric sulphate solution) and aerobically. CO_2 improved the growth of all of 4 Lactobacillus bulgaricus and 4 L. helveticus strains, 3 of 4 L. jugurt, 2 of 4 L. casei and none of 4 of L. acidophilus tested. MJL

33

Anabolism and catabolism of lactic acid in different layers of Emmental cheese. [Conference proceedings]
Steffen, C.; Nick, B.
XIX International Dairy Congress **1E**, 302-304 (1974) [1 ref. En] [Fed. Dairy Res. Sta., Liebefeld-Berne, Switzerland]

Lactose and glucose were completely metabolized after 24 h in all layers of Emmental cheese, whereas galactose was present up to 25 days. The formation and breakdown of lactic acid varied in different layers and at different times during manufacture. In 90-days old cheese there was a high content of propionic acid bacteria at the centre and a correspondingly lower level of lactic acid than in the outer layers. MEG

34

The action of enterococci on amino acids. [Conference proceedings]
Schmidt, J. L.; Lenoir, J.

XIX International Dairy Congress **1E**, 408 (1974) [4 ref. En] [Lab. de Recherche de la Chaire de Tech. (INRA), Inst. Nat. Agronomique Paris-Grignon, Thiverval, Grignon, France]

Only cysteine, tyrosine and arginine were degraded when cell suspensions of (i) Streptococcus faecalis subsp. liquefaciens (9 strains), (ii) Str. faecalis (1 strain), (iii) Str. durans (6 strains) and (iv) Str. faecium (6 strains) were incubated for 3 h at 40°C in the presence of a mixture of amino acids. Tyrosine decarboxylase was present in all strains whereas glutamic acid decarboxylase was present in only 1 strain each of (i) and (iii). Serine deaminase was present in 1 strain of (i), and all of (iii) and (iv). MEG

35

[Preparation of frozen, concentrated cultures of lactic acid bacteria and evaluation of their suitability in Edam cheese manufacture.]
Jakubowska, J.; Piatkiewiez, A.; Libudzisz, Z.; Zalicka, B.
Roczniki Technologii i Chemii Zywnosci **24** (1) 75-86 (1974) [38 ref. Pl, en] [Inst. Tech. Fermentacji i Mikrobiol. Politech., Lodz, Poland]

(i) Streptococcus lactis 115, (ii) Str. diacetilactis 239 and (iii) Lactobacillus casei WP-1 (all from the Olsztyn Pure Dairy Culture Laboratory) were cultured and treated as described in FSTA (1973) 5 3P384, except that for L. casei the medium of Elliker et al. [Journal of Dairy Science (1956) **39** (11) 1611-1612] was used and that culturing was for 12 h. The bottles of frozen (-20°C) cell concentrate (10^{10}-10^{11} cells/g) were rapidly warmed to 37-40°C before being used in cheesemaking. In 3 series of tests, Edam cheeses were made from 100-200 l. batches of milk using Str. lactis and Str. diacetilactis mixtures (at 1:1 and 2:1) and a mixture of all 3 organisms (at 1:1:1) at 5, 3, 2 or 1% of the cheese milk, conventional starter serving as control. Determination of numbers of lactic acid bacteria in cheeses after pressing and in ripe cheeses, and examination of the cheeses [see following abstr.] showed that the frozen conc. cultures are suitable for cheesemaking. They are simpler in application than conventional starters because culture propagation is avoided. SKK

36

[Lactobacilli in brine of reduced strength.]
Stadhouders, J.; Hup, G.; Hassing, F.
Voedingsmiddelentechnologie **7** (48) 17-19 (1974) [5 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Samples of diluted brine from 6 Dutch cheese factories were inoculated on agar medium containing 4% NaCl and incubated under anaerobic conditions at 30°C: high lactobacilli counts (1.5×10^6 to 2×10^7/ml) were found in 3 samples after 7 days. Dilutions of these samples were then incubated for 3 wk in an amino acid-phosphate medium + 6% NaCl; the degree of growth and CO_2 production varied markedly between samples. The 2 samples which showed significant CO_2 production were centrifuged and added to pasteurized milk which was then processed to Gouda cheese; both cheese showed evidence of extensive CO_2 production (eyes and cracks) after 4 months, together with phenolic flavour and other flavour defects. Experiments on growth of lactobacilli (from contaminated rennet) in media containing various concentrations of NaCl indicated that 9% NaCl prevented growth of Lactobacillus casei and 12% prevented or severely inhibited growth of most other strains. On the basis of these results it is recommended that the NaCl concn. of diluted brine should be kept as high as possible. ADL

37

[Lactobacilli in brine of reduced strength.]
Stadhouders, J.; Hup, G.; Hassing, F.
Officieel Orgaan, Koninklijke Nederlandse Zuivelbond **66** (49) 1170-1173 (1974) [5 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See preceding abstr.

38

Use of Lactobacillus bifidus for the manufacture of dried products for children and infant nutrition. [Conference proceedings]
Pech, Z.; Hrabova, H.; Dolezalek, J.
XIX International Dairy Congress **1E**, 570-571 (1974) [En] [Dairy Res. Inst., Prague, Czechoslovakia]

Growth rate of L. bifidus in conc. milk was decreased when the TS and temp. reached 30% and 80°C respectively, neither of which values are reached during processing. Combined cultures of L. bifidus with Streptococcus lactis subsp. taette or Str. thermophilus and with L. acidophilus + Pediococcus acidilactici retained their original proportions after processing but in reduced numbers. Viability decreased after 30 days storage. MJL

39

Production of Str. lactis mutants by exposure to N-nitroso-ethyl-urea. [Conference proceedings]
Pyatnitsyna, I. N.; Bannikova, L. A.
XIX International Dairy Congress **1E**, 382-383 (1974) [En] [All Union Res. Inst. of the Dairy Ind., USSR]

Homogeneous strains of Streptococcus lactis (coeff. of variation ≤10% for milk-clotting activity) were more resistant to N-nitrose-ethyl-urea (NEU) than were heterogeneous strains, whilst development of mutants with high milk-clotting activity was more pronounced amongst heterogeneous strains. Increases of 40-100% in milk-clotting activity were observed after exposure to 1% NEU. CDP

40

The technological suitabilities of the thermophilic streptococci. [Conference proceedings]
Choisy, C.
XIX International Dairy Congress **1E**, 422 (1974) [3 ref. En] [Lab. de Recherche de la Chaire de Tech. (INRA), Inst. Nat. Agronomique Paris-Grignon, Thiverval, Grignon, France]

105 strains of Str. thermophilus incubated at 40°C in autoclaved milk showed a higher rate of acidification than that of mesophilic streptococci. 50% of the strains produced >1 μg diacetyl/ml culture. Production of acetoin and acetaldehyde was 30-80 and 2-3 μg/ml respectively. The strains had high proteolytic activity and their use in cheese starters may be advantageous. MEG

41

Enhancement of the acid production of some lactic streptococci by milk-peroxidase. [Conference proceedings]
Stadhouders, J.; Hassing, F.
XIX International Dairy Congress **1E**, 369-370 (1974) [3 ref. En] [Netherlands Inst. for Dairy Res., Ede, Netherlands]

Some starter streptococci were observed to produce more acid in HTST pasteurized skim-milk than in strongly heated (80°C/10 min) skim-milk. The loss in acid-producing capacity was related to a loss in milk peroxidase activity as the temp. of heat treatment reached 77-80°C for 10 min. Addition of peroxidase to the strongly heated skim-milk restored high acid production by starter. The mechanism of this peroxidase/acid effect is not understood. MJL

42

Identification of lysogenic strains of mesophilic lactic acid streptococci. [Conference proceedings]
Mytnik, L. G.; Bannikova, L. A.; Bespalova, I. A.; Tikhonenko, A. S.
XIX International Dairy Congress **1E**, 390-391 (1974) [En] [All Union Res. Inst. of the Dairy Ind., USSR]

10 lysogenic strains were isolated from among 54 strains of lactic streptococci by incubating in diluted hydrolysed milk for 17 h at 30°C, treating with $CHCl_3$, centrifuging, mixing 1 ml of the supernatent in semi-solid medium containing an indicator strain, and preparing 2-layered plates. A further 77 strains were unsuccessfully screened by a modified Fisk cross-over method (not described). Morphological characteristics of a Streptococcus lactis phage are described. MJL

43

Influence of processing on the DDT content of meat products. (In "Isotope tracer studies of chemical residues in food and the agricultural environment".) [Conference proceedings]
Mirna, A.; Cornetti, K. (Food & Agriculture Organization; International Atomic Energy Agency)
pp. 51-58 (1974) [10 ref. En] [Fed. Inst. for Meat Res., Dept. of Chem. and Physics, Kulmbach, Federal Republic of Germany]

[^{14}C] DDT, which had been applied in vivo to rabbits, was determined by TLC together with its metabolites in meat processed in various ways and in dry sausage. In all preparations residues consisted mainly of unchanged DDT (60-94%). Tabulated data for metabolites detected were DDD (3-8%), DCB (1-3%), DDE (1-2%) and DDA (0-2%). Curing and processing to dry sausage reduced the DDT content by some 30%. A Micrococcus strain from a commercial starter culture for meat fermentation degraded DDT mainly to DDD and to a lesser extent to DCB. Lactobacilli were not able to metabolize the insecticide. AS

44

[Suppresion of lactic acid contamination of molasses by lactocidal agent.]
Shvets, V. N.; Slyusarenko, T. P.; Mel'nik, A. N.
Fermentnaya i Spirtovaya Promyshlennost' No. 6, 20-22 (1974) [3 ref. Ru] [KTIPP, USSR]

A high degree of contamination with bacteria during lactic fermentation reduces substantially the yield of alcohol during fermentation of molasses. This is accompanied by a considerable increase in the content of acids and esters, a substantial reduction in the content of higher alcohols, and aldehydes, and a reduction in the maltase and zimase activity of the yeast cells. Addition of 0.005% lactocidal antibiotic suppresses contamination in fermenting molasses without affecting the yield and quality of alcohol produced. STI

45

A study of the effect of soluble nitrogen sources on the growth of lactic streptococci for concentration. [Conference proceedings]
Shapton, N.
XIX International Dairy Congress **1E**, 376-377 (1974) [En] [Unigate Central Lab., London, UK]

Strains of Str. lactis, Str. diacetilactis and Str. cremoris were incubated in each of 6 enzymic hydrolysate media (skim-milk, 4 casein, soybean meal) and their acid-producing capacity measured subsequently in 10% reconstituted skim-milk. Str. cremoris strains gave the poorest response. Str. lactis and Str. cremoris strains responded favourably in most of the hydrolysates, soypeptone proving an effective N source. EJM

46

Lactic acid bacteria as sources of amino acids and vitamins. [Conference proceedings]
Shankar, P. A.; Laxminarayana, H.

XIX International Dairy Congress **1E**, 744-745 (1974) [3 ref. En] [Vet. Coll., Univ. of Agric. Sci., Bangalore, India]

Mixed cultures of Streptococcus lactis + Str. cremoris and Str. thermophilus + Lactobacillus bulgaricus contained the largest amounts of total amino acids (52.7 and 50.3%), methionine (9.1 and 7.2%) and lysine (7.0 and 21.8%), whilst 2.4-3.2% cystine was present in Str. lactis + Str. cremoris, L. bulgaricus and Str. cremoris cultures. Compared with levels in the heated milk (95°C/10 min), Str. cremoris increased thiamin (14%) and riboflavin (10.2%) contents of dahi, and Str. cremoris and Str. lactis increased the folic acid content by >200%. MJL

47

Production and preservation of lactic acid bacteria biomass. [Conference proceedings]
Kornacki, K.; Rymaszewski, J.; Ozimek, G.; Smietana, Z.
XIX International Dairy Congress **1E**, 436 (1974) [En] [Inst. of Food Eng. & Biotech., Agric. & Tech. Univ., Olsztyn, Poland]

High yields of lactic acid bacteria (10^9-10^{11} viable cells/ml) were obtained from pH-controlled batch culture in whey (partially hydrolysed with pepsin or papain) containing 0.5% yeast extract, 0.012% each of $MnSO_4$, $MgSO_4$ and $ZnSO_4$, and either 5% glucose or crude β-D-galactosidase to reduce the lag phase. Cell suspensions freeze-dried in a soluble milk protein derivative had a higher viability than cells spray-dried in dried milk. MJL

48

Changes in biochemical characteristics of coliform organisms during associative growth with lactic streptococci. [Conference proceedings]
Sukhova, T. S.; Koroleva, N. S.
XIX International Dairy Congress **1E**, 372-373 (1974) [En] [All-Union Res. Inst. of Dairy Ind., USSR]

As a result of associative growth with mesophilic lactic streptococci, standard coliform strains (e.g. Escherichia coli, Aerobacter aerogenes, Citrobacter freundii) showed some altered biochemical characteristics. In some cases, ability of E. coli to form indole or H_2S was altered, but citrate utilization remained unchanged. These changes may cause misleading results in hygienic evaluation of dairy products. CDP

49

Starters and their bacteriophages in lactic acid casein manufacture. [Conference proceedings]
Thomas, T. D.; Pearce, L. E.; Lawrence, R. C.
XIX International Dairy Congress **1E**, 409 (1974) [En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Because of the frequent appearance of phages to Streptococcus cremoris and the commercial impracticality of complete starter control by exclusion of phage from coagulation tanks, the following controlled starter system is suggested: several different starter strains are kept as separate mother cultures to which filter-sterilized whey is added periodically, thus allowing resistant strains to develop as virulent phages appear in the casein whey. CDP

50

Composition of lactic acid bacterial flora and lactic acid configuration in commercial Swiss yoghurt. [Conference proceedings]
Puhan, Z.; Flueler, O.; Banhegyi, M.
XIX International Dairy Congress **1E**, 451-452 (1974) [En] [Inst. of Dairy Tech., Swiss Fed. Inst. of Tech., Zürich, Switzerland]

Lactic acid bacteria count was max. at 6 days; as yoghurt got older, and pH decreased below 4.2, the proportion of lactobacilli increased to give a streptococci/lacrobacilli ratio of 1:1 at pH ≤3.7. The L(±)-/D(-)-lactic acid ratio changed in favour of the D(-) acid as the proportion of streptococci decreased. [See also FSTA (1974) 6 5P628 & 5P629.] CDP

51

Frozen bacterial concentrates for fermented products. [Conference proceedings]
Bannikova, L. A.; Lagoda, I. V.
XIX International Dairy Congress **1E**, 418 (1974) [En] [All-Union Res. Inst. of the Dairy Ind., USSR]

A stable concentrate of mesophilic lactic acid bacteria was obtained when cells, grown in a whey/hydrolysed milk/sodium citrate medium and harvested by centrifugation, were suspended in a protective aqueous solution of glycerine, sucrose and sodium citrate, and frozen in liquid N_2. Cell survival was 91-98%, of which 8-18% and 16-28% perished during storage for 6 months at -18°C and -6° to -8°C, respectively. CDP

52

Demonstration of lysogeny in strains of Streptococcus cremoris used as starters in cheesemaking. [Conference proceedings]
Lowrie, R. J.; Pearce, L. E.; Richards, E. L.
XIX International Dairy Congress **1E**, 412-413 (1974) [2 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

See Applied Microbiology (1974) **27** (1) 210-217.

53

The multiplication of bacteriophages for lactic streptococci during cheesemaking. [Conference proceedings]
Pearce, L. E.

XIX International Dairy Congress **1E**, 411-412 (1974) [3 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

When cheeses were made using 2 Str. cremoris starters and various low levels (≤7000/ml) of homologous phage, whey phage titres showed a constant multiplication factor (approx. 10^8 and 10^6 for phages to strains HP and AM_2 respectively) which defined the relative virulence of the phage. When all sensitive starter bacteria in the diffusion path of the phage through the curd had been eliminated, phage development ceased and acid production by the remaining bacteria continued. CDP

54

Presence of viable lactic acid bacteria in dairy products. [Conference proceedings]
Bottazzi, V.; Battistotti, B.; Dellaglio, F.
XIX International Dairy Congress **1E**, 581-582 (1974) [4 ref. En] [Catholic Univ., Piacenza, Italy]

Fontina cheese, made using raw milk and natural cultures, had max. count of $>2 \times 10^9$ streptococci + lactobacilli/g on the 30th day of ripening and still contained $>10^9$/g on the 90th day. The higher survival of these organisms in Fontina cheese than in yoghurt indicated the cheese's potential as a source of lactic acid bacteria for balancing the intestinal flora. CDP

55

Mechanism of the stimulatory action of proteolytic micrococci on lactic acid bacteria - utilization of this factor in the ripening and transformation of milk into hard cheese. [Conference proceedings]
Desmazeaud, M. J.; Devoyod, J.-J.; Feuillat, M.; Grude, P.
XIX International Dairy Congress **1E**, 424-425 (1974) [6 ref. En] [Lab. de Biochimie Microbienne, INRA, Jouy-en-Josas, France]

Peptides released from casein by proteolytic micrococci [see preceding abstr.] stimulated growth of mesophilic lactic streptococci in milk during ripening prior to cheesemaking, and provided a general source of amino acids for thermophilic streptococci as the peptides were broken down by intracellular peptidases of these organisms. Addition of micrococci during cheesemaking enhanced acidification, thereby improving coagulation and drainage to give a more flexible-bodied cheese. CDP

56

A screening method for detection of high flavour and high acid mutants of Streptococus diacetilactis for production of fermented milk. [Conference proceedings]
Kuila, R. K.; Ranganathan, B.
XIX International Dairy Congress **1E**, 448-449 (1974) [En] [Nat. Dairy Res. Inst., Karnal, India]

Following UV-irradiation of a wild strain, colonies surrounded by a clear zone after 18 h at 22°C on citrate agar containing calcium citrate showed increased diacetyl + acetoin formation in milk; those with no clear zone after 72 h showed increased acid-producing ability. The validity of this screening method was confirmed in 2 other standard strains. CDP

57

Milk with reduced lactose content for preparation of lactic acid starter culture concentrates. [Conference proceedings]
Lindgren, B.; Jönsson, H.; Leesment, H.
XIX International Dairy Congress **1E**, 431-432 (1974) [4 ref. En] [Swedish Dairies' Assoc., Malmö, Sweden]

Conc. cultures of Streptococcus lactis and Str. cremoris produced at constant pH (unspecified) in skim-milk with lactose content reduced to 2.5% by gel-filtration, did not differ from concentrates produced in normal skim-milk (4.8% lactose). Lactate accumulation and uncontrolled acid increase after removal of the continuous air supply to the medium was avoided by using the low-lactose skim-milk. CDP

58

Factors affecting the activity of starters in milks of different solid contents. [Conference proceedings]
Pulay, G.; Krasz, A.
XIX International Dairy Congress **1E**, 413-414 (1974) [1 ref. En] [Univ. of Agric. Sci., Mosonmagyarovar, Hungary]

Undissociated lactic acid was the most important factor inhibiting activity of butter starter bacteria in milks containing ≤26% TS, but at higher TS levels decreasing water activity played a gradually increasing role. Yoghurt starter was highly sensitive to water activity in milks with >25-28% TS. CDP

59

Enumeration of Streptococcus thermophilus and Lactobacillus bulgaricus in yoghurt cultures. [Conference proceedings]
Cooper, P. J.; Ashton, T. R.
XIX International Dairy Congress **1E**, 445-446 (1974) [4 ref. En] [Express Dairy Co. Ltd., London, UK]

0.01 ml of a culture diluted in dilute NH_4OH was spread over 1 cm^2, treated with methylene blue + defatting agent and bacterial units (single cells or chains) were counted microscopically in several fields. Results were consistently lower than viable counts, ratio of microscopic to viable count being 1:5.4 and 1:1.1 for streptococci and 1:8.8 and 1:1.4 for lactobacilli at 1/10 and 1/100 dilution, respectively. CDP

60

Some characteristics of five phages capable of lysing a strain of Streptococcus lactis. [Conference proceedings]
Sozzi, T.; Maret, R.; Bohren, H.

XIX International Dairy Congress **1E**, 443 (1974) [En] [Nestle Products, Vevey, Switzerland]

Of 5 phage types isolated from a single strain of Str. lactis 3 lysed sensitive strains in the absence of Ca^{2+}, produced large plaques and morphologically resembled Bradley's group A. The remaining 2 required Ca^{2+} but one failed to produce plaques and the other produced only a few small plaques; both resembled Bradley's group B. MJL

61

Use of Lactobacillus bifidus in the manufacture of new fermented milk products. [Conference proceedings]
Pech, Z.; Hrabova, H.; Teply, M.
XIX International Dairy Congress **1E**, 449-450 (1974) [En] [Dairy Res. Inst., Prague, Czechoslovakia]

Acidifying power, growth, production of volatile compounds etc. as well as rheological properties and organoleptic characteristics of the coagulum produced, were studied in several types of mixed cultures of L. bifidus with Streptococcus lactis, Str. cremoris, Str. lactis subsp. taette, Str. thermophilus, Leuconostoc dextranicum, Pediococcus acidilactici, L. acidophilus and L. bulgaricus at 30° and 37°C. The use of various combinations of the above microorganisms is recommended for the manufacture of fermented milk drinks and dried baby foods. FL

62

Heat resistant lactic acid bacteria and yoghurt production. [Conference proceedings]
Battistotti, B.; Bottazzi, V.; Dellaglio, F.
XIX International Dairy Congress **1E**, 735-736 (1974) [1 ref. En] [Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

Heat treatment of milk at 60°C for 20-30 min after inoculation with yoghurt culture, which had been adapted to resist normal pasteurization whilst retaining its acid-producing ability, reduced the level of contaminating microorganisms without modifying the characteristics of the product; the yoghurt had a pH of 4.3 and a cocci/bacilli ratio of 2:1 after 4 h at 45°C. CDP

63

The lactic acid bacteria: their proteolytic, reducing and acidifying activities in the ripening of cheeses. [Conference proceedings]
Carini, S.; Lodi, R.
XIX International Dairy Congress **1E**, 433-434 (1974) [En] [Centro per lo Studio Tech., Bromatologico e Microbiol. del Latte, Milano, Italy]

There were marked interstrain differences in proteolytic activity of lactic acid bacteria, whilst each species had a characteristic reducing power; neither property was related to lactic acid production which was dependent upon growth rate. CDP

64

Standards of selection of leuconostoc strains used in the making of Roquefort cheese. [Conference proceedings]
Devoyod, J.-J.; Melcion, D.; Auclair, J.
XIX International Dairy Congress **1E**, 419 (1974) [5 ref. En] [Lab. de Recherches Fromageres, INRA, Aurillac, France]

A marked correlation was observed between capacity of leuconostocs for producing CO_2 (respirometer measurement) and eye formation in the curd, which indicated that this characteristic would be a good criterion for selection of leuconostocs for eye formation in Roquefort cheese. CDP

65

Concentrated frozen suspensions of leuconostoc for Roquefort cheesemaking. [Conference proceedings]
Devoyod, J.-J.; Labbe, M.; Auclair, J.
XIX International Dairy Congress **1E**, 421 (1974) [1 ref. En] [Lab. de Recherches Fromageres, INRA, Aurillac, France]

When conc. frozen suspensions of leuconostocs were used, the % of close-bodied cheeses decreased from 22.6 to 1.7 whilst that of cheeses with normal eye formation increased from 75.1 to 96.8. However, there was an increase from 16.6 to 24.5 in the % cheeses with normal eye formation which were too moist; this indicated that, at certain periods, the action of leuconostocs should be completed by lactic starters to ensure satisfactory drainage of the curd. CDP

66

The effect of Lactobacillus casei on the ripening and quality of Emmental cheese. [Conference proceedings]
Dolezalek, J.; Svoboda, P.; Konradova, B.
XIX International Dairy Congress **1E**, 695-696 (1974) [En] [Univ. of Chem. Tech., Prague, Czechoslovakia]

By comparing Emmental cheeses made with and without L. casei, it was shown that, during ripening, L. casei stimulated formation of propionic and acetic acids and inhibited butyric acid, but did not affect proportions of aldehydes and methyl ketones. Although L. casei partly inhibited production of CO_2, its presence in cheese improved the flavour and consistency. CDP

67

An investigation on variations in acid and flavour production in mesophilic lactic streptococci during repeated sub-cultures. [Conference proceedings]
Bannikova, L. A.; Zadoyana, S. B.
XIX International Dairy Congress **1E**, 444 (1974) [En] [All-Union Res. Inst. of Dairy Ind., USSR]

46% of Streptococcus lactis cultures were homogeneous with respect to acid production (coeff. of variation <10%) and 36% of Str. acetoinicus cultures with respect to acid production and acetoin/diacetyl formation; these characteristics were retained through 8-12 subcultures. CDP

68

The nature of the stimulation of the growth of Streptococcus lactis by yeast extract.
Smith, J. S.; Hillier, A. J.; Lees, G. J.; Jago, G. R.
Journal of Dairy Research **42** (1) 123-138 (1975) [35 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne, Parkville, Victoria, 3052, Australia]

Yeast extract was fractionated on Sephadex G-25 into 7 fractions. The fraction most stimulatory to growth of Str. lactis C10 contained >70% of the amino N present in yeast extract and consisted of a wide variety of free amino acids and a small amount of peptide material. Examination of possible replacement factors for this fraction revealed that the amino-acid material present was largely responsible for the stimulation of Str. lactis C10. Purine and pyramidine bases and inorganic constituents also contributed to the stimulation. In addition, yeast extract contained a component which decomposed H_2O_2, a metabolite which accumulates in the growth medium under aerobic conditions and inhibits growth. The nature of the stimulation was studied by isolating slow and fast acid-producing colonies of Str. lactis C10. It appeared that yeast extract and other amino-acid supplements prevented an observed inhibition of the growth of the slow variants at pH <6.0, apparently by satisfying a nutritional deficiency caused by a drop in pH. AS

69

Citrate utilization in milk by Leuconostoc cremoris and Streptococcus diacetilactis.
Cogan, T. M.
Journal of Dairy Research **42** (1) 139-146 (1975) [17 ref. En] [Nat. Dairying Res. Centre, Agric. Inst., Fermoy, Co. Cork, Irish Republic]

Citrate utilization and diacetyl, acetoin and acetaldehyde production by 2 strains each of Leuc. cremoris and Str. diacetilactis in milk were studied. With the leuconostocs, no growth and little citrate utilization occurred unless a stimulant (yeast extract) was present, when complete utilization of citrate without concomitant production of diacetyl or acetoin was obtained. The addition of Mn^{2+} further stimulated growth and citrate utilization in the presence of yeast extract. Addition of citric acid after 65-h growth resulted in diacetyl and acetoin production. Destruction of diacetyl and acetoin occurred when the citric acid level fell to approx. 1000 and 600 μg/g in the case of Leuc. cremoris FR8-1 and CAF1, respectively. Only strain FR8-1 produced acetaldehyde. In contrast, Str. diacetilactis produced diacetyl, acetoin and acetaldehyde concomitant with citrate utilization. AS

70

Preparation of highly active lactic ferments.
Sozzi, T.
Nestle Research News pp. 123-127 (1973) [10 ref. En]
See FSTA (1973) 5 1P11 for Fr text.

71

Proteolytic enzymes of lactic streptococci and their use in improving body and texture of direct acid Cottage cheese.
Vahora, G. Y.
Dissertation Abstracts International, B **34** (12) 5811: Order no. 74-13271 (1974) [En] [Utah St. Univ., Logan, USA]

When cultured in skim-milk and whey at pH 6.1-6.2 and 32°C, proteolytic activity (on casein substrate), rate of acid production and growth rate of various lactic streptococci were in the order: Streptococcus lactis C2 > Str. cremoris HP > commercial mixed culture > Str. cremoris AM2 > Str. lactis ML8 > Str. cremoris P2. Proteolytic activity of all cultures was max. in the stationary growth phase. Extracellular protease, purified 1000-fold from Str. lactis C2 was stable at 80°C for 20 min, and activity increased linearly between 25° and 50°C after incubation for 5 h at pH 6.2. Partial culturing in skim-milk or incubation of freeze-dried crude enzyme preparation in skim-milk prior to manufacture of direct acid Cottage cheese, increased moisture and firmness of the curd and significantly improved body and texture of the product; partial culturing of skim-milk prior to acidification was also successfully applied in continuous production of Cottage cheese curd. CDP

72

Fermentation of soy milk oligosaccharides by lactic acid bacteria.
Mital, B. K.
Dissertation Abstracts International, B **35** (2) 880: Order No. 74-17658 (1974) [En] [Cornell Univ., Ithaca, New York, 14850, New York, USA]

The ability of lactic acid bacteria to ferment oligosaccharides was studied in soy milk prepared (i) from soaked, raw soybeans ground with boiling water and (ii) ground raw soybeans defatted with 95% ethanol and chloroform. All organisms showed higher growth rates in soy milk (i) than in (ii). Differences in (i) and (ii) were related to the loss of some growth factors during solvent extraction. Streptococcus thermophilus, Lactobacillus acidophilus, L. cellobiosis and L. plantarum exhibited significant growth and produced substantial amounts of acid in soy milk. α-Galactosidase activity necessary to serve α-D-galactosidic bonds in raffinose and stachyose was detected in several species of lactobacilli. The α-galactosidases from different lactobacilli showed max. activity in pH range 5.2-5.9. Utilization of oligosaccharides during fermentation of (i) was studied by GLC of trimethylsilyl derivatives. Soy milks were evaluated for organoleptic acceptability. (ii) was rated slightly inferior to fresh cows' milk

control but greatly superior to (i). A yoghurt like product made from (ii) using S. thermophilus was found more acceptable than that fermented with L. acidophilus or L. plantarum. Lactic fermentation did not significantly change the amino acid contents of the soy milk. VJG

73

[Improved technology of thin leaven production.]
Kazanskaya, L. N.; Gurina, O. F.; Afanas'eva, O. V.; Aleksandrova, E. N.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 10, 18-20 (1974) [Ru] [Leningradskoe Otdelenie Vses. Nauchno-issled. Inst. Khlebopekarsnoi Promyshlennosti, USSR]

The possibility was studied of shortening the period of the preparatory stage of thin leaven production, by using more active strains of lactic acid bacteria in combination with Saccharomyces cerevisiae yeasts. The control was prepared according to the process used at the Ivanovskyi plant, using an experimental leaven with reduced amount of crumb or without crumb; the water content was 75-80%. Reduction of water content to 75% without crumbs resulted in a very active growth of lactic acid bacteria and shortened the preliminary fermentation period. On the basis of experimental data obtained, most favourable production conditions for the preliminary leaven fermentation were proposed, which reduced the fermentation period 2.5 × in comparison with the old method. STI

74

[Comparative cultivation of some strains of lactobacilli on different nutrient media.]
Koritnik, Z.; Dragojlov, D.
Mljekarstvo **24** (8) 188-189 (1974) [3 ref. Sh]

When 5 media were compared for their suitability for growth and enumeration of Lactobacillus bulgaricus P3, L. helveticus X1 and L. acidophilus E, best results for all 3 species after incubation for 48 h were obtained on MRS agar; whey agar also gave good results. FL

75

[Lactic acid bacteria: their reducing, acidifying and proteolytic activities.]
Carini, S.; Lodi, R.; Vezzoni, A.
Latte Aug., 969-973 (1974) [36 ref. It, en] [Istituto di Ind. Agrarie, Univ. di Milano, Italy]

Changes in Eh of milk were studied on incubation with 11 strains of streptococci and 41 of lactobacilli from UK, USA, Czechoslovakia and Italy. Streptococcus faecalis subsp. liquefaciens produced the lowest Eh, -410 mV within 2 h; amongst the streptococci the smallest change in Eh was produced by Str. thermophilus after about 8 h. Lactobacillus casei and L. plantarum had the strongest reducing power of the lactobacilli, lowering Eh to at least -300 mV in 3-6 h. The other lactobacilli reduced the Eh to about -200 mV in 5-24 h. The variation in reducing power seemed to be independent of rate of multiplication of the strains or the pH. The proteolytic activity of lactobacilli isolated from whey starter was measured on milk using whole cells and on caseinate using cell extracts. The L. jugurti had the greatest activity, followed by L. helveticus and L. acidophilus; least activity was shown by L. bulgaricus and L. lactis. Both proteolytic activity and reducing power are considered important in the selection of starters for Grana cheesemaking. JMD

76

Inhibition of bacteria by some volatile and non-volatile compounds associated with milk. IV. Streptococcus lactis.
Kulshrestha, D. C.; Marth, E. H.
Journal of Milk and Food Technology **37** (12) 593-599 (1974) [26 ref. En] [Dept. of Food Sci. & Food Res. Inst., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Growth inhibition of Streptococcus lactis by milk associated compounds [FSTA (1971) **3** 2P368] was determined as in the preceding 3 abstr. using APT growth medium, incubated at 30°C. At a concn. of 10 ppm, formic acid was more inhibitory than the other acids tested, but at high concn. the extent of inhibition appeared to be directly related to chain length. Formaldehyde, chloroform, ether and ethylenedichloride inhibited at 10 ppm. Diacetyl was more inhibitory than methane thiol or ethane thiol. pH effects may have contributed to inhibition by high concn. of acids and amines. MJL

77

Inhibition of bacteria by some volatile and non-volatile compounds associated with milk. V. Leuconostoc citrovorum.
Kulshrestha, D. C.; Marth, E. H.
Journal of Milk and Food Technology **37** (12) 600-605 (1974) [10 ref. En] [Dept. of Food Sci. & Food Res. Inst., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Growth inhibition of Leuconostoc citrovorum by milk associated compounds [FSTA (1971) **3** 2P368] was determined as in the preceding 4 abstr. using APT growth medium, incubated at 30°C. At concn. of 1000 ppm, decanoic acid was the most inhibitory of the fatty acids tested. At 10 ppm, formaldehyde, propylamine and hexylamine were more inhibitory than any other compound, and at 100 ppm, acetonitrile, chloroform and ether were inhibitory late in the incubation period. pH effects may have contributed to inhibition by high concn. of acids and amines. MJL

78

Inhibition of bacteria by some volatile and non-volatile compounds associated with milk. VI.

Streptococcus thermophilus.
Kulshrestha, D. C.; Marth, E. H.
Journal of Milk and Food Technology **37** (12) 606-611 (1974) [9 ref. En] [Dept. of Food Sci. & Food Res. Inst. Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Growth inhibition of Streptococcus thermophilus by milk associated compounds [FSTA (1971) 3 2P368] was determined as in the preceding 5 abstr. using APT growth medium incubated at 30°C. At concn. of 100 and 1000 ppm all compounds tested were inhibitory. Decanoic acid was the most inhibitory of the fatty acids, and formaldehyde was more inhibitory than acetaldehyde or propionaldehyde. With the exception of diacetyl, formaldehyde, acetaldehyde, propionaldehyde and glyoxal, inhibition at ≤10 ppm by all compounds was relatively slight. pH effects may have contributed to inhibition by high concn. of acids and amines. MJL

79

[Stimulation of nisin biosynthesis in whey media.]
Szadkowska, M.; Lipinska, E.; Jakubczyk, E.; Lipniewska, D.
Roczniki Instytutu Przemyslu Mleczarskiego **16** (1) 5-13 (1974) [17 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

The value in nisin production of whey media supplemented with various substances considered capable of stimulating nisin biosynthesis was tested using the following nisin-producing strains of Streptococcus lactis: strain 91 isolated by Lipinska [Prace Instytutu Przemyslu Mleczarskiego (1955) 2 (2) 1-14]; strain F from the CNRA collection at Jouy-en-Josas (France); and strain 91/IV/C isolated by the authors after UV irradiation. It is concluded from tabulated results that using a whey medium with 2.5% potato syrup and 30% pepsin hydrolysate from a culture of group N streptococci in milk, yields of up to 4200 IU nisin/ml medium could be achieved, amounting to approx. 90% of the yield obtainable in skim-milk. The economic value of utilizing whey in nisin manufacture is discussed. SKK

80

[The properties of lyophilized cultures of lactic bacteria in sour milk.]
Nikolov, N. M.
Mikrobiologiya 1049-1051 (1973) [12 ref. Ru, en] [Tsentral'naya Lab. Molochnokisloi Promyshlennosti, Sofia, Bulgaria]

Survival ability and typical physiological, biochemical, morphological and cultivation properties of Streptococcus thermophilus and Lactobacillus bulgaricus were studied. The organisms were kept, following maintenance in sour milk, in the lyophilized state and under vacuum at +4°C for 10 yr. The regenerated cultures were allowed to ferment milk for 5 h. The resultant product, fermented with mixed regenerated bacteria, exhibited the same consistency, taste and flavour as the product produced by control fermentation tests. STI

81

A study on the preserving of lactic streptococci cultures by freezing.
Shehata, A. E.; El-Sadek, G. M.; Hassan, A. A.; El-Tobgui, H. A.
Egyptian Journal of Dairy Science **2** (2) 113-118 (1974) [11 ref. En, ar] [Food Sci. Dept., Ain Shams Univ., Cairo, Egypt]

Flasks containing 50 ml sterilized buffaloes' skim-milk were inoculated with 1% of single-strain cultures of Streptococcus lactis and Str. cremoris and frozen at -20°C immediately or after 4, 8 or 16 at 30°C, and were then stored for up to 16 wk. Survival and retention of activity during freezing and frozen storage was greatest when cultures were frozen immediately after inoculation. Str. lactis strains tended to be more resistant and to retain greater activity than Str. creamoris strains. CDP

82

Isolation and identification of lactobacilli associated with pickle fermentation. [Conference proceedings]
Deak, T.
IV International Congress of Food Science and Technology **4a**, 26-28 (1974) [En] [Dept. of Microbiol., Fac. of Food Tech., Univ. of Budapest, Hungary]

The population, species distribution and succession of lactic acid bacteria have been investigated in commercial cucumber and sauerkraut fermentations. A total of 686 isolates were collected and identified. The following species of lactobacilli have been found: Pediococcus cerevisiae, Streptococcus faecalis, Leuconostoc mesenteroides, Leuconostoc sp., Lactobacillus plantarum, L. brevis, and L. buchnerii. The similarities and differences between the 2 types of pickle fermentations concerning the lactic acid bacteria are discussed in relation to salt tolerance. AS

83

[Ecology and taxonomy of lactic acid bacteria of wine.] [Review]
Marques Gomes, J. V.
Anais do Instituto do Vinho do Porto 25, 31-71 (1972/1973, publ. 1974) [108 ref. Fr] [Inst. do Vinho do Porto, Portugal]

84

Utilization of oligosaccharides by lactic acid bacteria during fermentation of soy milk.
Mital, B. K.; Steinkraus, K. H.
Journal of Food Science **40** (1) 114-118 (1975) [29 ref. En] [Dept. of Food Sci. & Tech., Cornell Univ., New York St. Agric. Exp. Sta., Geneva, New York 14456, USA]

Utilization of oligosaccharides during fermentation of soy milk with lactic acid bacteria was studied. Trimethylsilyl derivatives of sugars were prepared and analysed Lactobacillus GLC. Fermentation of soy milk with Lactibacillus celobiosis resulted in complete utilization of sucrose and raffinose within 20 h. Stachyose concn. decreased 35% during this period and then remained unchanged. From 6 h onwards an unknown compound identified as mannitol appeared, probably formed by the reduction of fructose released during sucrose hydrolysis. L. plantarum completely utilized sucrose within 30 h, raffinose content decreased slightly during early stages of fermentation and then remained constant. Only 60% of stachyose was utilized. Fermentation of soy milk with L. fermenti showed complete utilization of raffinose and stachyose within 12 and 25 h respectively. Sucrose was not fermented. Fermentation of soy milk with a mixed culture of Streptococcus thermophilus and L. fermenti resulted in complete utilization of raffinose and stachyose, while 0.08% of sucrose remained unfermented. IFT

85

[Experiences on the biological stability of cask beer. II. Factors affecting the biological sensitivity of beer.] Erfahrungen mit der biologischen Haltbarkeit des Fassbieres. II. Faktoren, welche die biologische Empfindlichkeit des Bieres beeinflussen.
Hank, T.
***Brauwelt* 115** (6) 144-148; (8) 212-215 (1975) [6 ref. De, en] [Bierbrauerei Becker, 667 St. Ingbert/Saar, Federal Republic of Germany]

Factors influencing the sensitivity of beer to microbial infection (especially with lactobacilli) are discussed, and methods for detection of lactobacilli in water, wort, yeast, beer, fileter aids, stabilizers, barrels, bottles, bungs, NaOH solutions, air and alcoholic beverages are briefly described. Brief details are given of studies on the effect of residual beer treatment, barrel cleaning methods, use of magnetic barrel seals and malt quality and type on the biological stability of beer. [See FSTA (1973) 5 3H397 for part I.] TUB-IGB

86

[Influence of legume macerates on development of bacteria in port wine.]
Marques Gomes, J. V.; Formosinho Vaz de Oliveira, M. M.
***Anais do Instituto do Vinho do Porto* 25**, 73-94 (1972/1973, publ. 1974) [37 ref. Pt, fr, en] [Inst. do Vinho do Porto, Portugal]

Port wine (18 vol.% alcohol; total acidity, 53 m-equiv./l.; volatile acidity, 5 m-equiv./l.; reducing substances, 92.96 g/l.; 3.65) was kept in bottles at 22°C (control 1), or inoculated with a culture of lactic acid bacteria isolated from a contaminated port (control 2); experimental wines were produced by 15% addition of peas, lupin seeds, soybeans, or beans, each with or without the bacterial inoculum. The different wine samples were examined after 45 days and after 3 months. No significant changes in any of the initial characteristics were found after 3 months in the 2 control wines. In comparison with control 1, non-inoculated samples with legumes showed after 3 months increase in pH to 4.50-4.95 and, except for lupin, some increase in contents of reducing substances. Inoculated samples with legumes (IL) had a pH of 3.7-4.0, 19.0-32.9 g/l. reducing substances, 210-314 m-equiv./l. total acidity, and 118-170 m-equiv./l. volatile acidity. Strong development of bacteria was found in all IL samples, in contrast to lack of development in inoculated wine. The difference is attributed to passage of nutrient substances from the legumes to the wine. SKK

87

[The effect of lactic acid bacteria on the viability of Bacillus mesentericus during dough fermentation.]
Roiter, I. M.; Vitavskaya, A. V.; Kurilova, T. S.; El'tsova, O. P.; Muzaparova, R. M.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 9, 13-15 (1974) [Ru] [Kievskii Tekh. Inst. Pishchevoi Promyshlennosti, USSR]

In connection with intensified lactic acid fermentation during shortened dough fermentation methods (dough rising for about 20-30 min) conditions for killing B. mesentericus spores by the action of various lactic acid bacteria in leaven and dough were studied. Leaven prepared from wheat flour with a culture of heat-resistant bacteria strain E-1 (flour + water in a ratio of 2:1, temp. of culture 48-50°C) and leaven prepared with a culture of mesophilic lactic acid bacteria cultivated at pH 3.6-3.7 and temp. of 35-37°C were used. Moisture content, acidity, pH, microbial activity and the content of lactic acid bacteria/g were determined in leaven. Bread manufactured with the application of thermophilic bacteria exhibited fibrous texture after 60 h while bread manufactured with mesophilic bacteria showed this texture after 120 h. The mesophilic bacteria exhibited a high activity during the final phase of dough fermentation and completely inhibited B. mesentericus without affecting bread quality. STI

88

[Selection of method for determination of proteolytic activity of lactic acid bacteria and of starters.]
Grudzinskaya, E. E.; Maksimova, A. K.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 58-64, 128 (1974) [1 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

3 modifications of the method based on photocolorimetric determination of tyrosine at 650 nm with the Folin reagent, using a standard curve, were compared. The modification used in the authors' Institute and involving mixing the sample with trichloroacetic acid solution and holding for 20 min at 3-5°C before filtration, then holding the extract with reagent for 8-10 min before colour measurement is recommended for routine examinations. SKK

89

Role of enterococci in Cheddar cheese: proteolytic activity and lactic acid development.
Jensen, J. P.; Reinbold, G. W.; Washam, C. J.; Vedamuthu, E. R.
Journal of Milk and Food Technology **38** (1) 3-7 (1975) [16 ref. En] [Dept. of Food Tech., Iowa St. Univ., Ames, Iowa 50010, USA]

8 lots of Cheddar cheese were manufactured using 2 strains of Streptococcus faecalis and Str. durans in combination with a commercial lactic culture [see FSTA (1974) **6** 8P1177]. Each lot consisted of a control vat of cheese, manufactured with lactic starter only, and an experimental vat of cheese containing the lactic starter and one of the enterococcus strains. Combinations of 2 curing temp. (7.2° and 12.8°C) and 2 early cooling treatments (air vs. brine cooling) were used for cheeses from each vat. Proteolysis and lactic acid development were monitored from milling to up to 6 months of curing. Cheeses manufactured with Str. faecalis exhibited more protein breakdown than did the control cheeses and those made with Str. durans, the latter 2 being nearly identical in the extent of proteolysis. More proteolysis was consistently observed in those cheeses cured at 12.8°C. No statistical difference was observed in proteolytic activity between air- and brine-cooled cheeses. Cheeses made with Str. durans had a higher final % of lactic acid than did controls and cheeses made with Str. faecalis. Cheeses manufactured with enterococci exhibited a more rapid initial production of lactate. Cheeses cured at 12.8°C had greater % of lactic acid compared with those cured at 7.2°C. Air-cooled cheeses also developed significantly higher levels of lactic acid than did brine-cooled cheeses. AS

90

[New valuable types of lactic acid bacteria for production of pickled cheese.]
Erzinkyan, L. A.; Charyan, L. M.; Pakhlevanyan, M. Sh.; Vekilyan, S. M.
Biologicheskii Zhurnal Armenii **27** (9) 68-74 (1974) [21 ref. Ru, am] [Inst. Mikrobiol. AN ArmSSR, USSR]

The screening of 119 strains of lactic acid bacteria isolated from cheese starters from different districts of Armenia resulted in selection of types resistant to high concn. of salt and showing high proteolytic activity. Organoleptic evaluation of pickled cheese "Chanakh" made from pasteurized and raw milk with starters of newly isolated strains as compared with control cheese made from raw milk without addition of any lactic acid bacteria showed that the cheese made from pasteurized milk using pure strains of lactic acid bacteria had the higher rating. STI

91

[Evaluation of Streptococcus lactis cultures by acid-forming capacity and milk coagulation time.]
Pyatnitsyna, I. N.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 33-38, 125 (1974) [4 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Populations of 60 cultures of each of 2 strains of Streptococcus lactis were classified by acid-forming capacity in milk (titratable acidity achieved after 17-h incubation of standardized small inoculum) into 22 groups in the range 40 to 110°T; and by milk coagulation time into 6 groups in the range 5-5 h to no coagulation in 24 h. Correlation coeff. between the 2 characteristics were -0.2 for 1 strain and -0.3 for the other. It is concluded that the 2 characteristics complement but do not replace each other, and that the most valuable cultures are those combining high acid-forming capacity with short coagulation time, but that, in discrepancy of characteristics, evaluation on coagulation time should take precedence over that on acid-forming capacity. SKK

92

[Manufacturing value of Str. lactis cultures assessed by statistical characteristics of their population.]
Pyatnitsyna, I. N.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 38-47, 126 (1974) [5 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyhslennosti, Moscow, USSR]

740 cultures (inoculation variants) were obtained from 13 strains of Streptococcus lactis isolated from natural sources; milk coagulation times were determined for the variants and for the initial strains. Mode, mode wt. and median of the values classified as in the preceding abstr. were used to evaluate variant distributions. A strain is considered of manufacturing value if its variant population has the following characteristics: a short milk coagulation time (4-6 h); ≤25% of variants below the median; mode wt. >50%; and mode above the median value and preferably within the population range. Strains with mode wt. >50% but with mode below median value should be rejected even if showing a short coagulation time, because of inherent instability. It is considered that strains with 30-50% variants in the long coagulation time range but symmetrically distributed might be of interest for mutagenic studies. SKK

93

[Effect of repeated drying and UV irradiation on lactic acid bacteria.]
Lukovnikova, L. A.; Anatskaya, A. G.; Ovsyannikova, A. V.; Kapotina, Z. A.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 21-32,

124 (1974) [2 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Cultures of 4 strains each of (i) Streptococcus lactis, (ii) Str. cremoris, (iii) Str. acetoinicus and (iv) Str. diacetilactis and 2 strains each of (v) Lactobacillus bulgaricus and (vi) L. acidophilus were spray-dried 3 × on a Niro-Atomizer installation (inlet air temp., 125-130°C; outlet air temp., 58-60°C), with reconstitution in between. The dried strains were also irradiated in liquid media (hydrolysed milk/peptone for streptococci and hydrolysed milk/yeast autolysate broth for lactobacilli) with a BUV-15 lamp for 15-20 s. The dried or dried and irradiated suspensions were plated on hydrolysed milk agar and approx. 50 colonies from each culture were studied for acid-forming capacity and diacetyl + acetoin formation. After drying, selected strains of (i), (ii), (iii), (v) and (vi) showed higher viable counts (and consequently acid- and aroma-forming capacities) than did equivalent vol. of the initial cultures, but (iv), while gaining in acid-forming capacity, lost the ability to produce diacetyl. UV irradiation in general enhanced the effects of drying on the streptococci except that (iv) did not recover diacetyl-forming capacity; with lactobacilli, irradiation had no notable advantage over drying alone. SKK

94

Recovery of Lactobacillus bulgaricus and Streptococcus thermophilus on nine commonly used agar media.

Moon, N. J.; Hamann, A. C.; Reinbold, G. W.

Applied Microbiology **28** (6) 1076-1078 (1974) [6 ref. En] [Dept. of Food Tech., Iowa St. Univ., Ames, Iowa 50010, USA]

Of the 9 media tested, Eugon, Elliker's lactic agar (pH 6.8), and modified tryptic soy broth agars showed superior recovery [and colony morphology] of L. bulgaricus and Str. thermophilus [7 strains of each]. AS

95

[Utilization of lactic cultures in the dairy.]

Hardy, J.; Ramet, J. P.

Technicien du Lait May, 7, 9, 11, 13, 15, 17 (1973) [Fr] [ENSAIA Laiterie, Nancy, France]

Properties of lactic acid bacteria, composition of lactic starters, commercial strains, utilization of cultures, and starter defects are briefly discussed. Flow diagrams are presented for 3 schemes of utilization of non-concentrated cultures. CDP

96

[Stability of freeze-dried lactic acid bacteria.]

Lagoda, I. V.; Bannikova, L. A.

Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 107-114, 132 (1974) [13 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Various methods were compared for freeze-drying 5 cultures each of Streptococcus acetonicus, Str. thermophilus, Str. lactis, Str. diacetilactis, Str. cremoris, Lactobacillus acidophilus and L. bulgaricus. In the procedure finally chosen, an 18-h culture of the strains in sterilized skim-milk containing 16% solids was added (30% inoculum) to the protective medium of the authors [see FSTA (1970) **2** 7P934] and 1-ml ampoules of the mixture were frozen to -40°C and freeze-dried at an initial temp. of from -23°C to -25°C and a final temp. of 32-35°C for 8-10 h to achieve moisture contents of approx. 1% (total duration of drying, 40-42 h). Survival rates directly after drying decreased in the order of spp. listed above from 96 to 85% for the streptococci and 82 to 78% for the lactobacilli. The ampoules could be stored for 2 yr at -18°C or for 18 months at 4-6°C without loss of activity or cultural and biochemical properties. SKK

97

[Dried symbiotic starter for 'Yuzhnaya' and Mechnikov prostokvasha, varenets, ryazhenka and yoghurt.]

Lagoda, I. V.; Bennikova, L. A.

Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 115-121, 135 (1974) [7 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Symbiotic starters containing Streptococcus thermophilus and Lactobacillus bulgaricus in the proportions of from 4:1 to 2:1 and grown in sterilized skim-milk were added at 40% to the protective medium and freeze-dried as described in FSTA (1970) **2** 7P934. Survival rate of the cells directly after drying was 70-92%, the lactobacilli being more sensitive than the streptococci to drying. The preparation was stable in storage for 6 months at 4-6°C and for 3 months at 18-25°C; after reconstitution, it did not differ in properties from fresh starter. SKK

98

[Properties of Streptococcus lactis cultures used in starters for cultured milks.]

Zadoyana, S. B.; Bannikova, L. A.; Mytnik, L. G.

Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 3-11, 122 (1974) [18 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Morphological and biochemical characteristics of 6 Streptococcus lactis strains from the Collection of the Industrial Starters Laboratory of the All-Union Dairy Industry Research Institute were studied. In addition to characteristics typical of Str. lactis, all 6 strains grew in the presence of 20 or 30% bile, and 2 grew in the presence of 40%. These 2 strains, but not the others also grew at pH 9.2 and 9.6. SKK

99

[Natural and transient variability of Streptococcus lactis cultures.]
Bannikova, L. A.; Zadoyana, S. B.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 11-21, 123 (1974) [10 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

5 strains of Streptococcus lactis from the collection named in the preceding abstr. and 1 freshly isolated from a natural source were cultured on hydrolysed milk agar containing 2% $CaCO_3$ and 2 ml 1.6% bromocresol purple/l.; 60-100 colonies from each culture were inoculated into skim-milk and subcultured 6-9 × during March-Sept. The acid-forming capacities of the different subcultures were measured in °T. Subculturing did not alter the ratio of weak to strong acid formers in colonies of predominantly homogeneous (strong) character but caused increase in proportion of weak acid formers in colonies of predominantly heterogeneous character. The acid-forming ability of subsultures depended to a greater extent on seasonal changes in milk composition than on the number of transfers. SKK

100

[The effect of Zn, Cd and Hg salts on the growth of lactic acid bacteria.]
Savel, J.; Prokopova, M.
Kvasny Prumysl 20 (12) 265-267 (1974) [7 ref. Cs, ru, en, de] [Jihoceske Pivovary, Ceske Budejovice, Czechoslovakia]

Growth inhibition of 8 strains of lactobacilli and 7 of pediococci (4 and 1 collection strains respectively and the rest from beer) was in the order Hg≥Cd>Zn; Cd and Zn salts were more inhibitory to pediococci than to lactobacilli. Min. inhibitory concn. (MIC) of $CdCl_2.2.5H_2O$ in fermented wort agar was 200-1400 mg/l. for lactobacilli and 1.6-200 mg/l. for pediococci; corresponding MIC of $ZnCl_2$ were 6400-12 800 and 400-6400 mg/l., and of $ZnSO_4.7H_2O$ were 12 800-25 600 and 800-25 600 mg/l. The Hg salts suppressed growth of lactobacilli to the same extent as that of pediococci. [From En summ.] STI

101

Food preservation and antibacterial properties of four fluoroalkane compounds.
Auken, O. W. van; Healy, J.; Kaufmann, A. J.
Canadian Journal of Microbiology 29 (6) 891-896 (1974) [19 ref. En, fr] [Dept. of Physical and Biol. Sci., Southwest Res. Inst., PO Drawer 28510, San Antonio, Texas 78284, USA]

Trichlorofluoromethane (Freon 11), dichlorofluoromethane (Freon 21) and monochlorodifluoromethane (Freon 22) were tested for antimicrobial properties in foodstuffs over a 12-wk period at room temp. (22°C). Freon 21 at >68 mg/ml prevented bacterial growth in milk; Freon 11 was less effective. Freon 21 was also the most effective for preservation of other food products, concn. for max. microbial inhibition being 6.6 mg/ml in eggs and fish and 13.1 mg/ml in shrimp; Freon 11 was only slightly less effective whereas Freon 22 failed to show any food preserving properties at the concn. tested (≤4.53 mg/ml). The same 3 fluorocarbons and dichlorodifluoromethane (Freon 12) were tested for inhibitory activity against colony development of Streptococcus lactis ATCC 27861. Inhibitory activity was in the order Freon 21 > Freon 11 = Freon 12 > Freon 22. Delay in acid production by Str. lactis in milk increased with increasing concn. of Freon 21 (up to 68 mg/ml) and was greater at 22° than at 37°C. CDP

102

[Production of lactic acid bacteria biomass on enriched whey medium.]
Kornacki, K.; Rymaszewski, J.; Prosniewska, G.
Roczniki Technologii i Chemii Zywnosci 24 (2) 203-216 (1974) [17 ref. Pl, en] [Inst. Inzynierii i Biotech. Zywnosci, ART, Olsztyn, Poland]

15 variants of a whey medium were used in production of Streptococcus lactis biomass in 2-l. fermenters at 30°C; a 5% inoculum of the T_1 strain from the Olsztyn Institute's collection was added and incubation was for 16-18 h with periodic adjustment of pH to 6.0-6.5 with NH_4OH. Best results were obtained with a medium consisting of whey from milk partly hydrolysed with papain, enriched with 0.5% yeast extract, 0.12 g each of $MnSO_4$, $MgSO_4$ and $ZnSO_4$/l., and with lactose added during incubation. With this medium, the final concn. of viable cells was 2.1×10^{11}/ml and the biomass DM yield was approx. 7 g/l. [See also FSTA (1971) 3 9P1489.] SKK

103

[Heat sterilization of lactic acid bacteria contaminating Tane-koji.]
Sugama, S.; Hongo, K.; Murakami, H.
Journal of Fermentation Technology [Hakko Kogaku Zasshi] 52 (9) 657-661 (1974) [8 ref. Ja] [Res. Inst. of Brewing, Tax Administration Agency, Takinogawa, Kita-ku, Tokyo, Japan]

Commercially available Tane-koji (i) (sporulated koji used as seed material for koji making) is sometimes regarded as a source of infection by lactic acid bacteria in sake brewing. With the aim of destroying these contaminants by heat but minimizing the heat inactivation of Aspergillus oryzae conidiospores, the heat drying conditions of (i) were examined. The heat resistance of lactic acid bacteria depended on species and cultural age. Leuconostoc mesenteroides B-95 was more stable than Lactobacillus casei B-83 and, for both, cells harvested from cultures at max. growth were most stable. Cells of Leuc. mesenteroides at max. growth were used for determination of the drying conditions. The thermal death patterns of the test organisms on the surface of steamed rice or on (i) seemed to be related to the patterns of heat drying of solid materials; the rate of thermal death in the

constant rate period of drying was more rapid than in the falling rate period. In the latter period, the critical moisture content was in the range 0.15-0.20 g/g DM. A 2-step method for drying (i), using low temp. drying during the constant rate period succeeded by high temp. drying in the falling rate period is proposed. HK

104

Conversion of arginine to ornithine during malo-lactic fermentation in red Swiss wine.
Kuensch, U.; Temperli, A.; Mayer, K.
***American Journal of Enology and Viticulture* 25** (4) 191-193 (1974) [11 ref. En] [Federal Res. Sta., Section of Biochem., CH-8820 Wädenswil, Switzerland]

During malo-lactic fermentation in red Swiss wines by a mixture of different strains of Leuconostoc oenos, stoichiometric conversion of arginine to ornithine was observed. Evidence is presented that the reaction is linked to the urea cycle. Practical implications of these findings are discussed. AS

105

A fluorescent antibody technique for the enumeration of faecal streptococci in water.
Pugsley, A. P.; Evison, L. M.
***Journal of Applied Bacteriology* 38** (1) 63-65 (1975) [5 ref. En] [Dept. of Civil Eng., Univ. of Newcastle upon Tyne, NE1 7RU, UK]

106

[Proteolytic activity in selection of lactic streptococci.]
Maksimova, A. K.; Grudzinskaya, E. E.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 64-80, 128-129 (1974) [10 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Components of 2 tvorog starters were tested at different times of the year for proteolytic activity. 1 starter consisted of 4 strains of (i) Streptococcus lactis and 3 strains each of (ii) Str. cremoris and (iii) Str. acetoinicus; the other consisted of 3 strains each of (i) and (ii) and 2 of (iii). Tyrosine formation in sterilized skim-milk at 30°C was measured after 4, 8 or 24 h, and acidity and coagulation time were also determined. In prolonged subculturing, (i) and (iii) strains showed more stable properties than (ii) strains. Starters with persistently high manufacturing quality proved to be composed of strains with high and stable proteolytic activity. SKK

107

[Effects of X-ray induced mutants and certain stimulants on fermentation processes in milk products manufacture.]
Dilanyan, Z. Kh.; Saakyan, R. V.; Sarkisyan, R. A.; Sagoyan, A. S.; Chuprina, D. F.; Amirkhanyan, R. A.
***Biologicheskii Zhurnal Armenii* 27** (6) 70-76 (1974) [24 ref. Ru, am] [Erevanskii Zooveterinarnyi Inst., Problemnaya Lab. Molochnogo Dela, USSR]

The possibilities were studied for increasing the biochemical activity of lactic acid bacteria during cheese production by addition of yeasts (Torulopsis spp.) and trace elements to stimulate growth of the lactic acid bacteria, or by using highly-active X-ray-induced mutants of the lactic acid bacteria. Both the application of yeasts and trace elements and the use of the X-ray mutants (having proteolytic activity up to 60% higher than that of the parent strains) significantly shortened the ripening stage (by about 25%), yielding cheese of similar or better quality. STI

108

[Control of the activity of lactic acid bacteria in commercial yoghurt.]
Lusiani, G.
Latte Jan., 22-26 (1975) [11 ref. It, en]

Italian regulations specify that yoghurt should contain large quantities of viable Lactobacillus bulgaricus and Streptococcus thermophilus. 130 commercial Italian samples of stirred curd yoghurt were examined microscopically for an assessment of the cocci:bacilli ratio; the activity of the lactic acid bacteria was assessed by serial dilution of the yoghurt with a tryptone/salt solution and incubation of the dilutions with skim-milk at 45°C, followed by an assessment of the coagulation and of the cocci:bacilli ratio. Most yoghurt samples gave balanced growth of both organisms after 10^6-fold dilution; one group of yoghurts gave low microscopic counts and a predominantly streptococcal flora. In some tests, the dilutions were homogenized, but this did not give consistent results. JMD

109

[Selection of lactic streptococci for starter for granular tvorog manufacture.]
Bannikova, L. A.; Pyatnitsyna, I. N.; Prusakova, N. V.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 48-58, 127 (1974) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

55 of 111 strains of Streptococcus lactis, 14 of 16 Str. cremoris, 53 of 60 Str. acetoinicus and 16 of 25 Str. diacetilactis strains were phage resistant and were used to assess the suitability of starters for manufacture of granular (Cottage cheese-type) tvorog. Various combinations of strains were used and organoleptic properties, amounts of lactic acid, volatile acids, diacetyl, acetoin and CO_2, proteolytic activity of the experimental starters, and firmness and viscosity of the coagula were studied. A starter consisting of suitably chosen strains of the 4 species is recommended, subculturing of the starter being carried out at 25-26°C in pasteurized or sterilized skim-milk acidified with lactic acid to pH 5.1-5.2. SKK

110

Intracellular proteases from S. lactis and S. cremoris.
Krishna, B. M.; Dutta, S. M.
Milchwissenschaft **29** (12) 723-726 (1974) [21 ref. En, de] [Nat. Dairy Res. Inst., Karnal, Haryana, India]

Intracellular proteases of Streptococcus lactis C10 and Str. cremoris C1 were extracted from 16-18 h cells grown in casein medium, and the resultant cell-free extracts were purified 4.5- and 6-fold respectively by $(NH_4)_2SO_4$ fractionation. Activity of the Str. lactis and Str. cremoris enzyme preparations was max. at pH 6.5 and 7, respectively; Str. lactis enzyme activity increased with temp. from 22° to 45°C (highest temp. studied), whilst that of the Str. cremoris enzyme was max. at 40°C. Activity of both enzyme preparations was greater on casein substrate (particularly κ-casein) than on [β-]lactoglobulin, bovine serum albumin or haemoglobin; was increased in the presence of reducing agents (glutathione, cysteine, ascorbic acid, sodium thioglycollate and Na_2SO_4); and was inhibited by sodium diethyldithiocarbamate, iodoacetic acid, HgI_2 and metal ions. Complete inhibition by sulphydryl-blocking reagents indicated that sulphydryl groups are involved at the active site of the enzymes. CDP

111

Nisinogenic streptococci and their use in the making of Provolone cheese.
Senesi, E.; Emaldi, G. C.; Caserio, G.
Latte Feb., 84-86 (1975) [7 ref. It, en] [Istituto Sperimentale Lattiero-Caseario, Lodi, Milan, Italy]

30 streptococcal strains that could inhibit Micrococcus flavus were isolated from raw milk and were tested for acid production, heat resistance and nisin production; 2 nisin-producing strains were selected for use in making Provolone cheese. Provolone cheese made with whey starter and added clostridia and the nisin-producing streptococci showed slow acid development, poor yield and, in some cases, blowing. These faults were prevented by addition of nisin-resistant Lactobacillus helveticus to the whey starter. JMD

112

[Effect of incubation temperature on the ratio of Lactobacillus bulgaricus to Streptococcus thermophilus in yoghurt.] Beeinflussung des Verhältnisses Lb. bulgaricus: Str. thermophilus in Joghurt durch die Bebrütungstemperatur.
Puhan, Z.; Banhegyi, M.
Schweizerische Milchwirtschaftliche Forschung 3 (Nov.) 9-13 (1974) [9 ref. De] [Lab. für Milchwissenschaft, Inst. für Lebensmittelwissenschaft der Eidgenössischen Tech. Hochschule, Zürich, Switzerland]

2 commercial yoghurt starters, with L. bulgaricus:Str. thermophilus ratios of 1:2.2 and 1:0.8 respectively, were inoculated at 2% into whole milk which had been heat-treated at 85°C and were incubated at 39° or 45°C. Subcultures were taken when the yoghurt reached pH 4.37-4.4 (after 20 h) and were placed immediately in iced water and stored at 4°C for next day's use. At every 5th subculture, samples were taken with each 0.5 unit change in pH, for enumeration of lactobacilli and streptococci. In both starters, the L. bulgaricus:Str. thermophilus ratio became stabilized after the 10th-15th subculture. Typical Lactobacillus/Streptococcus ratios for the 20th subculture were, at pH 4.5 and 4.0 respectively: 1st starter, 38°C, 1:32 and 1:7, and 45°C, 1:4 and 1:2; and 2nd starter, 38°C, 1:15 and 1:8, and 45°C, 1:6 and 1:2. Neither lactobacilli nor streptococci were inhibited in the starters under these conditions. SKK

113

[Distribution chains of goats'cheese.] Les circuits de distribution des fromages de chevre. [Book]
Badiou, -.; Gernelle, -.; Kramarz, -.
77pp. (1973) [Fr] 75579 Paris, France; Institut Technique de l'Elevage Ovin et Caprin [Societe d'Etudes pour le Developpement Economique et Social, 75007, Paris, France]

An attempt was made to assess the prospects for an increase in goats' cheese consumption in France, by studying factors liable to prevent present and anticipated future demand from being satisfied. 16 goats' cheese producers, 30 middlemen and 109 retailers were covered by the study, which was supported by a consumer study (published separately). Main conclusions included: (i) annual increases of >10% in sales were possible; (ii) there would be a decline in the role of independent producers, small wholesalers and small retail shops; (iii) the increasing role of purchasing centres and large shops would influence qualitative demand, with big increases in sales of Ste Maure cheese in particular; there would be a big demand for factory cheese, but farm cheese would probably retain its special position in the market; (iv) policies to encourage goats' milk production were urgently needed in order to take advantage of market opportunities; (v) difficulties in increasing retail dales related mainly to product quality rather than price, and to the consumers' poor knowledge of the cheeses (29% of housewives could not name a single goats' cheese). ADL

114

[Capacity of a Lactobacterium bulgaricum and Streptococcus thermophilus starter to produce antibiotic substances.]
Mel'nikova, E. V.; Koroleva, N. S.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 33, 92-97, 130 (1974) [9 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

6 strains of Lactobacillus bulgaricus and 8 of Streptococcus thermophilus were tested separately and in 10 pairs for production of substances inhibitory to Escherichia coli. L. bulgaricus strains were more inhibitory than Str. thermophilus strains, and those showing inhibition were also strong acid

formers. Inhibition by mixed L. bulgaricus/Str. thermophilus starters increased with increase in the proportion of L. bulgaricus and decrease in pH. SKK

115

Lactobacilli in the human diet. [Conference proceedings]
Speck, M. L.
Dairy Industries **40** (4) 129, 133 (1975) [En] [N. Carolina St. Univ., Raleigh, N. Carolina, USA]

This detailed extract of a paper presented at the 3rd Marschall symposium held in London in 1974, deals mainly with Lactobacillus acidophilus bacteria, covering their incorporation into human diet (e.g. after antibiotic therapy), preparation of concentrated L. acidophilus cultures and their use in human and animal diets, inhibitory effects of L. acidophilus on pathogenic bacteria and implantation of L. acidophilus bacteria in human intestinal tract. FL

116

[Study of development of lactic acid bacteria in heat-treated milk.]
Leshina, V. S.; Bogdanov, V. M.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 35, 91-98, 110-111 (1974) [5 ref. Ru] [VNIMI, Moscow, USSR]

Portions of a batch of raw bulk milk were heat-treated under laboratory conditions at (i) 85°C for 10 min or (ii) 95°C for 30 min, or were sterilized (iii) in an autoclave at 120°C for 10 min or (iv) in Stork sterilizer at 135°C for 20 s. Growth was studied in (i)-(iv) of Streptococcus lactis, Str. cremoris, Str. diacetilactis, Str. thermophilus and Lactobacillus bulgaricus during incubation for 48 h at the optimum growth temp. for each organism. All organisms grew best in (iii) and (iv), except for Str. cremoris which grew best in (iv) and least well in (ii) and (iii). SKK

117

[Changes in morphological and cultural properties of standard strains of coliform bacteria in mixed culture with lactic streptococci.]
Sukhova, T. S.; Koroleva, N. S.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 35, 3-13, 103-104 (1974) [11 ref. Ru] [VNIMI, Moscow, USSR]

Collection strains of Escherichia coli, Citrobacter freundii and Aerobacter aerogenes were each cultured in milk jointly with 1 or 5 Collection strains of Streptococcus lactis, 5 Str. cremoris, 5 tvorog starters and 2 smetana starters; changes in morophological and cultural characteristics of the coliform bacteria were studied after culturing for 24 h on Endo medium. It is concluded that, in general, the microscopic picture of the S (smooth) colonies remained unchanged but that the cultural properties of the coliform strains changed appreciably, and the colonies tended to be smaller. E. coli showed the greatest stability in mixed culture, retained its biochemical activity and formed typical cultures, while Aerobacter aerogenes proved markedly labile. SKK

118

[Changes in biochemical properties of standard strains of coliform bacteria in mixed culture with lactic streptococci.]
Sukhova, T. S.; Koroleva, N. S.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 35, 13-26, 104 (1974) [9 ref. Ru] [VNIMI, Moscow, USSR]

It was found in a study similar to that described in the preceding abstr. that, in Escherichia coli cultured jointly with mesophilic lactic streptococci, indole formation is an unstable characteristic, whereas inability to utilize of citrate remains unchanged. Formation of acetoin and H_2S, the character of the methyl red reaction and ability to utilize citrate are unstable characteristics of the citrate-positive coliforms and may give a false picture of their presence in cultured milk products, tvorog in particular. The urease activity test remained negative in the coliforms in mixed culture. [See also FSTA (1975) **7** 5P872.] SKK

119

Isolation of Streptococcus lactis C2 mutants with high phospho-β-galactosidase activity.
Schifsky, R. F.; McKay, L. L.
Journal of Dairy Science **58** (4) 482-493 (1975) [30 ref. En] [Dept. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

Lactose constitutive mutants of group N streptococci with enhanced ability to utilize lactose could not be distinguished from uninduced (wild-type) cells by any of the methods tested, but results suggested that these mutants may possess high basal phospho-β-galactosidase (β-PGal) activity. Continuous growth of Str. lactis C2 in a chemostat at limiting lactose concn. resulted in selection of mutants which had β-PGal activity 1.5-4 × that of the parent culture, and were able to grow on lactobionic acid (which confirmed their constitutive nature). Further tests on one of the mutants showed that it had a shorter lag period than Str. lactis C2 in Harvey-Collins medium and grew with no lag period in 11% reconstituted dried skim-milk (vs. 45 min lag for Str. lactis C2). CDP

120

[Temperature conditions and course of lactic acid fermentation in Sbrinz cheese.]
Temperaturverhältnisse und Verlauf der Milchsäuregärung in Sbrinz-Käse.
Steffen, C.; Rentsch, F.
Schweizerische Milchzeitung **100** (53) 357-358 (1974) [4 ref. De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld-Bern, Switzerland]

Manufacturing conditions of Sbrinz cheese were studied in 6 factories of which 1 pressed 3 cheeses/press, 3 pressed 2 cheeses/press, and 2 pressed cheeses individually. Mean values and ranges are tabulated for main stages of coagulum preparation (scalding temp. range, 56.9-57.5°C; curd removal temp. range, 53.75-55.0°C); for temp. changes in the rim zone and in the cheese interior during ≤20 h; as well as for course of lactic acid fermentation in the same time. pH values in cheese at 2 h ranged from 5.70 to 6.30, and at 20 h, they ranged from 5.16 to 5.40. Corresponding values for L-lactic acid were (μmol/g): 9.8-34.9 and 62.7-88.2; and for D-lactic acid, they were 1.6-16.0 and 45.1-86.4. SKK

121

Influence of lactic cultures on the biochemical, bacterial and organoleptic changes in beef.
Reddy, S. G.; Chen, M. L.; Patel, P. J.
Journal of Food Science **40** (2) 314-318 (1975)
[27 ref. En] [Dept. of Food Sci. & Tech., Alabama A&M Univ., Normal, Alabama 35762, USA]

The effects of lactic cultures (Streptococcus lactis plus Leuconostoc citrovorum) on quantitative and qualitative bacterial populations, protein and fat degradations, pH changes and organoleptic qualities in ground beef and beef longissimus dorsi muscle steaks were evaluated. Samples were treated with 450 ppm ascorbic acid and 10% cultures plus 450 ppm ascorbic acid. Samples were evaluated and compared with control during 0-, 2- and 4-day storage periods. Samples treated with cultures plus ascorbic acid had significantly lower Gram-negative bacterial counts, proteolysis, lipolysis and pH during 2- and 4-day storage periods compared with control and ascorbic acid-treated samples. Also, culture-treated samples were scored significantly higher for organoleptic qualities. There were no significant differences in the Gram-negative bacterial species growing in treated and untreated samples. Pseudomonas, Achromobacter and Proteus were predominant species isolated from the samples. These results indicate a significant influence of lactic cultures on beef quality retention. IFT

122

[The lactic acid forming microflora of dry sausage and the technologically determined changes in undergoes.] Die Milchsäure bildende Rohwurst-Mikroflora und ihre technologisch bedingte Veränderung.
Urbaniak, L.; Pezacki, W.
Fleischwirtschaft **55** (2) 229-232, 235-237 (1975)
[39 ref. De, en, fr] [Inst. für Tech. der Lebensmittel Tierischer Herkunft, Landwirtschaftlichen Akad., Mazowiecka 48, 60-623 Poznan, Poland]

The physiological characteristics of dry sausage-fermenting bacteria, their changes during sausage manufacture, and glucose fermentation by isolated strains were studied. Cervelat sausages were produced with 0.2% added sucrose, glucose, maltose or potato flour, and were either smoked or treated with smoke concentrate. Sausages were examined after drying, smoking and 10, 20 and 40 days storage. The number of lactic acid-forming bacteria varied with changes in the medium, processing time and type of added carbohydrate. Carbohydrate decomposition was affected by its mol. wt., Eh, incubation temp. and the composition of the microflora. The lactic acid-forming bacteria are initially chiefly homofermentative strains, but as a result of changes in the medium adaptive enzymes are induced and heterofermentative strains become predominant. The activation of adaptive enzymes explains the constantly changing equilibrium of fermentation, and complete oxidation of added carbohydrates. During manufacture and storage of dry sausages the most growth occurred among typically heterofermentative strains. [Continued in following abstr.] RM

123

[The lactic acid forming microflora of dry sausage and the technologically determined changes it undergoes.] Die Milchsäure bildende Rohwurst-Mikroflora und ihre technologisch bedingte Veränderung.
Urbaniak, L.; Pezacki, W.
Fleischwirtschaft **55** (2) 229-232, 235-237 (1975)
[39 ref. De, en, fr] [Inst. für Tech. der Lebensmittel Tierischer Herkunft, Landwirtschaftlichen Akad., Mazowiecka 48, 60-623 Poznan, Poland]

[Continued from preceding abstr.] All the 129 bacterial strains isolated fermented glucose, 80% fermented sucrose, 29% maltose, and 24% all 3 sugars. All strains produced H_2O_2. All carbohydrates, especially potato flour reduced variations and kinetics of the drop in the number of bacteria. The homofermentative rods found were streptobacteria, chiefly Lactobacillus plantarum (36%, present mainly in the outer region) and L. leichmanii (4%). The heterofermentative rods resembled L. brevis and L. buchneri. They were at first present at much lower counts than homofermentative organisms but increased during manufacture and early storage. RM

124

[Growth yield of Streptococcus cremoris cultivated at controlled pH.]
Irie, R.; Okamoto, T.; Morichi, T.
Journal of the Agricultural Chemical Society of Japan [Nibon Nogei Kagakkai-shi] **48** (6) 343-349 (1974) [22 ref. Ja, en] [Nat. Inst. of Animal Ind., Aoba-cho, Chiba-shi, Japan]

A simple system for laboratory cultivation of lactic acid bacteria at automatically controlled pH is described. A strain of Str. cremoris was grown at 30°C in 300 ml of culture medium containining 2% tryptone, 1% yeast extract, 5% lactose and 0.2% NaC the pH of the culture was maintained at 6.0-6.2 using NH_4OH. It was noted that the main part of the growth curve was linear against time (an arithmetic linear growth). The max. growth yield of 4.2 mg dry wt./ml (viable count, 3.7×10^9/ml) was

attained after about 12 h, whereas the alkali consumption continued until the sugar was exhausted. The acid produced was mainly L(+)-lactate. The overall Y_{ATP} (g cells formed/mol ATP formed) was about 9, as calculated on an assumption that one mol of ATP was formed/mol of alkali consumed. However, higher Y_{ATP} value of about 15 was found in the earlier part of the growth. Some physiological and practical implications of these results are discussed. AS

125

Effects of yeasts isolated from cheese on the growth of lactic acid bacteria in skim-milk.
Yamauchi, K.; Kang, K. H.; Kaminogawa, S.; Komagata, K.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] **46** (2) 73-80 (1975) [16 ref. Ja, en] [Fac. of Agric., Univ. of Tokyo, Japan]

4 strains of Debaryomyces hansenii, 2 each of Candida lipolytica and Cand. zeylanoides and 1 strain of Cand. pseudotropicalis were each tested for their effect on growth of a lactic starter (1:1 Streptococcus lactis 527 and Str. cremoris H-61) in skim-milk at 25°C. When inocula of 10^5 yeasts/ml were used, the count of lactic acid bacteria increased from 10^4 to 10^9/ml after about 5 days and remained at this level for 1 month; the pH of the milk fell to 4.31 after 5 days then gradually increased to 5.2 after 1 month. When yeasts were not present, lactic acid bacteria increased to 10^9/ml after 5 days then decreased to $<10^2$/ml after 15 days; pH fell to 4.1 and remained at this level. Proteolytic activity of yeasts (D. hansenii or Cand. zeylanoides) and starter bacteria cultured together was greater than the sum of their activities when cultured independently. Further studies using D. hansenii AJ 4193 showed that this organism prolonged the survival of lactic acid bacteria when it was inoculated at 10^4 or 10^6/ml but not at 100/ml. The increased proteolytic activity of lactic acid bacteria in the presence of yeasts was inhibited in the presence of >3% NaCl and at low temp. (5° or 10°C). [From En summ.] CDP

126

[Volatile fatty acids produced in fermented milk of high dry matter content.]
Silant'eva, D. A.; Novotel'nov, N. V.; Ibragimova, A. Z.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 5, 154-156 (1974) [5 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, USSR]

Quantitative changes in individual volatile fatty acids produced by lactic streptococci in milk of different TS contents were studied. The milk high in TS was prepared by dissolving dried skim-milk in fluid milk. Increased concn. of TS in the milk affected the formation of volatile fatty acids; acetic acid increased while formic, propionic and butyric acids decreased. STI

127

[Study on obtaining Streptococcus lactis mutants with increased nisin production, by gamma irradiation.]
Hylmar, B.; Teply, M.; Pokorna, L.
Prumysl Potravin **26** (2, Mlekarske Listy **1** (1)) 86-89 (1975) [17 ref. Cs] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

All 10 nisin-producing strains of Streptococcus lactis obtained from the Lactoflora Collection were used in these studies, involving evaluation of > 3000 isolates. The most active isolate obtained after γ-irradiation produced a max. of 1700 IU nisin/ml vs. 470 IU/ml for the parent strain; this activity increased to 2200 IU/ml after storage in a freeze-dried culture. In milk, nisin production was about the same in static or submerged [stirred?] cultivation whilst a substantially higher nisin level (7800 IU/ml) was obtained in a whey medium with added $CaCO_3$, after 20 h of submerged [stirred?] cultivation. The nisin-producing capacity was found to be sufficiently stable, and it is considered that the mutants could be used in the production of dried nisin milk, or in a whey medium in the preparation of pure crystalline nisin. FL

128

Microbiology of Parmesan cheese.
Marth, E. H.
Italian Cheese Journal **4** (2) 1-3 (1975) [En] [Dept. of Food Sci., Wisconsin Univ., Madison, Wisconsin, USA]

3 lots of cheese from a USA cheese factory were tested. The cheese was manufactured from milk containing 1.7-1.8% fat, using Lactobacillus bulgaricus whey starter, and was held for 3 days at 70-75°F, placed in brine for 18 days and then ripened at 54°F. Aerobic bacterial counts began to decline early during ripening, and decreased from 10^7-10^9/g in the fresh cheese to 10^4-10^6/g after 10 months. Counts of lactic acid bacteria were 10^6-10^7/g throughout ripening, with cocci predominating in the fresh cheese and lactobacilli after 7 months. Faecal streptococci (predominantly Streptococcus faecalis) numbered 10^5/g initially but declined to $<10^3$/g after 10 months. Neither coliforms nor staphylococci survived well in the cheese and were virtually absent after 2 months of ripening. CDP

129

Purification and properties of antimicrobial substances produced by Streptococcus diacetilactis and Leuconostoc citrovorum.
Branen, A. L.; Go, H. C.; Genske, R. P.
Journal of Food Science **40** (3) 446-450 (1975) [18 ref. En] [Dept. of Food Sci., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

A medium consisting of 5% spray-dried whey plus 0.5% yeast extract was found to be excellent for the production and subsequent purification of the antimicrobial substances. The antimicrobial activities of Str. diacetilactis and Leuc. citrovorum

were similar in many respects; however, cation exchange and gel chromatography indicated that distinctly different substances accounted for the activity of the 2 organisms. A low mol. wt. antimicrobial preparation was obtained from a Str. diacetilactis fermentation liquor using methanol extraction followed by cation exchange and gel chromatography. The purified material showed antimicrobial activity towards several Pseudomonas species and was peptidyl in nature. Lactic or acetic acid appeared to account for much of the antimicrobial activity of Leuc. citrovorum. IFT

130

[Grouping of strains of streptococci isolated from animal material in relation to their physiological properties.]
Truszczynski, M.; Kocik, T.; Kryszkowski, M.
Medycyna Weterynaryjna **28** (10) 589-591 (1972) [15 ref. Pl] [Zaklad Mikrobiol., Inst. Weterynarii, Pulawy, Poland]

175 strains of streptococci isolated from mastitis milk, 57 isolated from canned meat, and 18 collection strains were grouped using rabbit antisera of Lancefield groups B, C and D. The strains were also examined for (i) physiological characteristics and by (ii) the CAMP test. 66 strains could not be classified by any of the tests. Of 90 strains serologically identified as group B, 51 also showed results of (i) and (ii) characteristic of group B, but for 38 only (i) was characteristic. For 10 group C strains, corresponding figures were 8 and 1; and for 18 group D strains, they were 17 and 0. 46 of 49 strains giving (i) and (ii) results characteristic of group D did not give a typical precipitation with group D antiserum. Simultaneous serological typing and CAMP testing are recommended for this group. [A shortened version of this paper was published under the same title in Medycyna Weterynaryjna (1972) **28** (8) 464-466.] SKK

131

[Effect of drying on Lactobacillus bifidus flora in baby foods of Lakton type.]
Pech, Z.; Hrabova, H.
Prumysl Potravin **26** (2, Mlekarske Listy **1** (1)) 89.9-94.14 (1975) [21 ref. Cs] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Effects of concn. of milk (8.90-43.23% TS) on growth and biochemical activity of L. bifidus were studied as well as the survival of this organism on exposure to heating at 70-85°C during drying in a pilot Niro plant at drying air temp. of 150-170°C and exit air temp. <60°C. The results showed that, in milk with 20-23% TS as used in the manufacture of Lakton, neither the growth nor biochemical activity was unfavourably affected; increasing the TS content to ≥30%, however, had an adverse effect. When dried samples containing L. bifidus alone or in combination with Streptococcus thermophilus and Str. lactis subsp. taette, or with L. acidophilus and Pediococcus acidilactici, were stored for upto 5 months under cold, dark conditions, the viable counts declined about 10-fold every months, and it is suggested that the guaranteed period should not exceed 3 months. FL

132

[Rapid gas chromatographic method for determination of lactic acid in fermented milk.]
Kageyama, K.; Yasui, S.; Takahashi, S.
Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi] **21** (6) 288-290 (1974) [6 ref. Ja, en] [Dept. of Physiol., Osaka City Univ. Med. School, Osaka, Japan]

A 1.5 m glass column of PEG-6000 (10%) on terephthalic acid solid support allowed separation of lactic acid without converting it into a volatile compound. It was not necessary to extract, esterify or form the trimethyl-silylate derivative of the sample. Column temp. was programmed from 120° to 190°C at 6°C/min. The fermented milk sample was added with H_2SO_4 at 0.1% to the column. [From En summ.] DMK

133

[Factors promoting bitterness in yoghurt.] Beitrag zur Kenntnis von Faktoren, die Bitterkeit im Joghurt begünstigen.
Renz, U.; Puhan, Z.
Milchwissenschaft **30** (5) 265-271 (1975) [28 ref. De, en] [Inst. für Lebensmittelwissenschaft, Eidgenössische Tech. Hochschule, Zurich, Switzerland]

Raw bulk milk was homogenized at 60°C, heated for 1 min at 85°C or for 20 min at 95°C, inoculated with 2.5% of the 2 Lactobacillus bulgaricus/Strepococcus thermophilus starters described in FSTA (1975) 7 8P1823, incubated at 38° or at 44°C to reach pH 4.0 or 4.4, cooled and stored at 4° or at 8°C. Bitterness was assessed at intervals during 25 days' storage on a 5-point scale by an expert panel, and proportions of N fractions and contents of L- and D-lactic acids were determined. Results are graphically presented or tabulated in detail. It was found that yoghurts produced at 44°C were seldom or never bitter, but that yoghurts produced at 38°C with an initial pH of 4.4 showed strong bitterness. Correlation coeff. between degree of bitterness and D-lactic acid increase was 0.86; that between D-lactic acid and whey non-protein N was 0.70; and that between whey non-protein N and bitterness was 0.74. As L. bulgaricus produces virtually only D-lactic acid and Str. lactis produces predominantly L-lactic acid [see Steffen et al., Schweizerische Milchwirtschaftliche Forschung (1973) **2** (Nov.) 46-51), it is concluded that the bitterness of yoghurt is caused above all by the proteolytic activity of L. bulgaricus during storage. SKK

134

[Metabolic aspects of lactobacilli during ripening of sausages (salami).]
Cantoni, C.; Aubert, S. d'; Bianchi, M. A.; Beretta, G.
Industrie Alimentari **14** (1) 88-92 (1975) [17 ref. It, en] [Istituto di Ispezione degli Alimenti di Origine Animale, Univ. di Milano, Milan, Italy]

Studies on the metabolic characteristics of 7 strains of lactobacilli isolated from salami (1 strain of L. casei, 1 strain of L. plantarum and 5 other

strains of the subgenus Streptobacterium) are described. The characteristics studied were peptidase activity, utilization of amino sugars, utilization of individual amino acids, decarboxylation of histidine, tyrosine and tryptophan, and utilization of carnitine. Tables of results are given. The results are discussed in relation to the role of lactobacilli in the ripening of salami. AJDW

135

Fourth Long Ashton Symposium. Lactic acid bacteria in beverages and food. Proceedings of a Symposium held at Long Ashton Research Station, University of Bristol, 19-21 Sept., 1973.
[Conference proceedings]
Carr, J. G.; Cutting, C. V.; Whiting, G. C. (United Kingdom, Long Ashton Research Station) (Editors)
xv+415pp. ISBN 0-12-160650-3 (1975) [many ref. En] London, UK; Academic Press Inc. Price £10.80

Papers presented at the 4th Long Ashton Symposium include: The lactic acid bacteria - a broad view, by M. Ingram (pp. 1-13, 57 ref.); The metabolism of organic acids by lactic acid bacteria, by F. Radler (pp. 17-27, 24 ref.); Some biochemical and flavour aspects of lactic acid bacteria in ciders and other alcoholic beverages, by G. C. Whiting (pp. 69-85, 69 ref.); Chemical structure of a growth factor and its physiological significance for malo-lactic bacteria, by T. Amachi (pp. 103-118, 14 ref.); Beer spoilage lactic acid bacteria, by C. Rainbow (pp. 149-158, 11 ref.); Some properties of gas-forming lactic acid bacteria and their significance in classification, by E. I. Garvie (pp. 339-349, 16 ref.); A review of biochemical techniques in the classification of lactobacilli, by R. A. D. Williams (pp. 351-367, 61 ref.); and Lactics of the world unite, by J. G. Carr (pp. 369-380, 23 ref.). A further 18 papers are abstracted separately and indexed additionally under United Kingdom, Long Ashton Research Station [Symposium]. VJG

136

Lactobacilli in production of soy sauce, sour-dough bread and Parisian barm. [Lecture]
Wood, B. J.; Cardenas, O. S.; Yong, F. M.; McNulty, D. W.
pp. 325-335 (1975) [14 ref. En] [Dept. of Applied Microbiol., Univ. of Strathclyde, Glasgow, UK]

Basic processes for the preparation of soy sauce and sour-dough bread are described. The role of lactic acid bacterial in the 2 fermentations are compared and the interaction between yeasts and lactic acid bacteria during fermentation is considered. Compositional changes in the soybean wheat flour mixtures during the koji stage of soy sauce manufacture are tabulated. It was found that the lactic acid bacteria began growing at the initiation of the Moromi stage and the yeasts developed later. Bread doughs made with ferments containing lactic acid bacteria were found to rise less than equivalent doughs made with yeasts only. The resulting bread is reputed to have a longer shelf-life. The significance of maltose phosphorylase activity of lactic acid bacteria in food fermentations is discussed. CRI

137

[Rapid culture of brewery lactic acid bacteria.] Schnellzüchtung von Brauerei-Milchsäurebakterien.
Hsu, W. P.; Taparowsky, J. A.; Brenner, M. W.
Brauwissenschaft **28** (6) 157-160 (1975) [7 ref. De, en, fr, es] [Schwarz Services Int. Ltd., Mount Vernon, New York, USA]

A new medium (Hsu's Lactobacillus-Pediococcus medium) which allows rapid and selective detection and enumeration of lactobacilli and pediococci is described. Most species of Lactobacillus and Pediococcus may be detected 16-24 h after inoculation; all species tested gave easily countable colonies and good recovery within 48 h. This medium and its method of use create anaerobic conditions within the medium; no special apparatus for anaerobic incubation is therefore required. TUB-IGB

138

Detection of lactobacilli in brewing. [Lecture]
Kirsop, B. H.; Dolezil, L.
pp. 159-164 (1975) [10 ref. En] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

Lactobacillus and Pediococcus were used as test genera in order to develop a rapid method of detection and enumeration of viable lactic acid bacteria (as low as 50 organisms/l.) in beer. With existing techniques, after concn. of bacteria on membranes, they may be detected microscopically or by induction of growth. Various fluorescent dyes were investigated for their suitability for Lactobacillus; the most useful was Euchrysine 2GNX. However, the small size of cells made routine monitoring of membranes laborious. This was overcome by allowing cells to grow on MRS medium (on the membrane) in the presence of 750 ppm Mg^{++} and Euchrysine. This resulted in long chains of easily detected fluorescent cells. Choice of media and growth conditions depended on the strains present. With slow growing strains microscopic examination is recommended. For rapidly growing strains it is easier to detect some attribute of growth such as CO_2 evolution or electrical impedance in media as the cells grow. CRI

139

A second enzymatic activity for decomposition of malic acid by malo-lactic bacteria. [Lecture]
Kunkee, R. E.
pp. 29-42 (1975) [32 ref. En] [Dept. of Viticulture & Enology, Univ. of California, Davis, California 95616, USA]

A sensitive fluorometric assay for NADH was used to detect intermediates in the decarboxylation reaction of L-malic acid to L-lactic acid. Cell-free extracts of Leuconostoc oenos ML 34 were assayed for CO_2 and NADH formation using 1.5 mmM NAD as coenzyme and 8 mM L-malic acid at pH

5.6. NADH forming activity was 0.00345 µmole/min/mg protein compared with 1.55 µmole CO_2 formed/min/mg protein. Results from heat inactivation and heavy metal inhibition tests indicated that only one enzyme was involved in the decarboxylation reaction and the second reaction producing NADH and pyruvic acid as end product. The significance of this second activity is discussed in relation to the effect of malic acid on the metabolism of the organism.
CRI

140

Factors of the malo-lactic fermentation of wines. [Lecture]
Lafon-Lafourcade, S.
pp. 43-53 (1975) [13 ref. En] [Inst. d'Oenologie de Bordeaux, Inst. Nat. de la Recherche Agronomique, Univ. de Bordeaux II, France]

13 strains of lactic acid bacteria were tested for their rate of L-malic acid degradation in 15 wines and a test medium of grape juice yeast extract (10% alcohol). Wines were adjusted to pH 3.5, 10% alcohol and 5 g/l. L-malic acid. Chemical analyses of the wines are tabulated. From the test medium assay, some strains exhibited a weak 'malic activity' (0-22% acid degraded) and some a strong 'malic actvitiy' (74-100% acid degraded). Results are tabulated for malo-lactic fermentability of wines. It is suggested that some inhibitory or activating compounds are present in wines to which bacteria vary in their sensitivity. To induce malo-lactic fermentation in wines under conditions of pH, alcohol concn. and SO_2 where bacterial growth would be difficult, it is recommended that a relatively large inoculum of resting bacterial cells from strains with a medium rate of malic degradation and good resistance to inhibitory substances or good sensitivity to activating substances be used. Recommended strains are Lueconostoc gracile CF34 and Lactobacillus hilgardii E63, with medium rates of 53 and 57%, respectively. CRI

141

Determination of the activity of the malo-lactic enzyme of lactic bacteria using a carbon dioxide electrode. [Lecture]
Lonvaud, M.; Ribereau-Gayon, P.
pp. 55-68 (1975) [15 ref. En] [Inst. d'Oenologie, Univ. de Bordeaux II, Bordeaux, France]

The malo-lactic enzyme activity of wine lactic bacteria was determined using a CO_2 electrode. A description of the apparatus, its principle and method of use is given. Several methods for preparation of cell-free extracts from Lactobacillus plantarum A 8014 and L. hilgardii BC_2 were evaluated for breakage efficiency by electron microscopy. CO_2 released from the enzymic degradation of L-malic acid produces a pH change in the electrolyte which is directly proportional to the partial pressure of CO_2. Results are tabulated for acid degradation and CO_2 evolution. Specific activities of different bacterial strains isolated from wines are also tabulated. From reproducibility studies it was concluded that use of a CO_2 electrode is particularly well adapted to the biochemical study of the malo-lactic fermentation mechanism in wines. CRI

142

A malo-lactic bacterium and its growth factor. [Lecture]
Yoshizumi, H.
pp. 87-102 (1975) [11 ref. En] [Central Res. Inst., Suntory Ltd., Shimamoto-cho, Mishima-gun, Osaka, Japan]

69 malic acid-degrading strains of bacteria were isolated from wines in order to elucidate the growth-stimulating factor present in fruit and vegetables. Examination of media and culture conditions showed that addition of tomato juice to the medium was essential. An anaerobic strain WNB-75 played an important part in malo-lactic fermentation, and was found to require the growht factor present in tomato juice (2.5-5%). The isolation procedure for the growth factor (TJF) is described. Purification was by TLC; results from glucosidases inactivation of the TJF indicated that it contained a glucose residue with a β-glucosidic linkage. Structural studies by NMR suggested that the factor was a β-glucoside made up of 1 mole each of D-pantothenic acid and glucose and also a glucosyl residue. CRI

143

Control of malo-lactic fermentation in table wines by addition of fumaric acid. [Lecture]
Pilone, G. J.
pp. 121-138 (1975) [57 ref. En] [Mont la Salle Vineyards, PO Box 420, Napa, California 94558, USA]

This review covers the use of fumaric acid as an acidulating agent in young table wines of low acid content where malo-lactic fermentation may be undesirable. Relatively low levels of fumaric acid (up to 1.5 g/l.) are effective, their efficiency increasing with lower pH values of wines. During fermentation fumaric acid is metabolized by yeasts and should therefore be added only to young wines, not to musts or juices. The pathway proposed for fumaric acid degradation by malo-lactic bacteria is by conversion to L-malic acid catalysed by fumarase with subsequent malo-lactic fermentation. Fumaric acid has been found to have a bactericidal effect in wines inoculated with 2 strains of Leuconostoc sp. Numerous tables and figures are included.
CRI

144

Factors which affect the spontaneous initiation of the malo-lactic fermentation in wines. The possibility of transmission by inoculation and its effect on organoleptic properties. [Lecture]
Castino, M.; Usseglio-Tomasset, L.; Gandini, A.
pp. 139-148 (1975) [4 ref. En] [Istituto Sperimentale per l'Enologia, Asti, Italy]

72 Italian wines were used to study the conditions favouring development of spontaneous malo-lactic fermentation (judges to have occurred by a lactic acid content >1 g/l.). 67% of the samples showed a malo-lactic fermentation (MLF). Grouping of the samples according to degree or absence of MLF showed that pH <3.20, alcohol content >12% and SO_2 content >100 mg/l. were

inhibitory. Results are tabulated. Studies on Barbera and Freisa wines showed that a decrease in pH from 3.6 to 3.4 to 3.20 led at each step to a delay of about 10-15 days in the onset of MLF. Extensive studies on the bacterial population responsible for MLF indicated that in order to control MLF in wines, the bacterial inoculum must consist of strains shown to be active at the pH of the recipient wine. Organoleptic evaluation of wines showed no significant difference between chemical deacidification and biological deacidification by MLF. All malo-lactic bacteria isolated from wines showing MLF were Leuconostoc spp. These bacteria were able to survive for about 2 months and ferment the inoculated pasteurized wines in 10-20 days.
CRI

145

Lactic acid bacteria in distillery fermentations. [Lecture]
Bryan-Jones, G.
pp. 165-175 (1975) [9 ref. En] [Distillers Co. Ltd., Glenochil Res. Sta., Menstrie, Clackmannanshire, UK]

Characteristics of lctic acid bacteria isolated from malt whisky distillery fermentations showed that they are adapted to growth at relatively high temp. and acidity. Methods used for study of the bacteria are outlined and enumeration media discussed. A simple agar droplet enumeration technique is illustrated and described in detail. Bacteria are diluted in an agar medium and droplets of the dilutions placed in a Petri dish. After incubation, colonies in the droplets are counted. A comparison of this technique with counts obtained by a conventional plating technique showed the former to have several advantages. Bacteria from the droplets were isolated and identified. The range of characters used is tabulated.
CRI

146

[Studies on the lactic microflora of various Italian table olive varieties and the corresponding brines. I. Controlled lactic fermentation studies.] [Lecture]
Balloni, W.; Brighigna, A.; Cucurachi, A.; Florenzano, G.
Annali dell'Istituto Sperimentale per la Elaiotecnica **3**, 107-142 (1973) [23 ref. It, es, fr, en]

Studies on the microflora of 20 samples of green olives of 4 var., and of 41 samples of the corresponding brines are described. Tables of values are given for counts of yeasts, fungi, total bacteria and lactic acid bacteria in the olives, and total aerobes, coli-aerogenes groups, aerobes, fungi, yeasts and lactic acid bacteria in the brines. The fermentation activity of the lactic acid bacteria isolated from the olives and brines is discussed. It is concluded that the quality of the fermented olives is dependent on the strains of lactic acid bacteria present, and the lactic acid bacteria:yeast ratio. A ratio of 100-200:1 is necessary for good lactic fermentation and preservation of the olives; lower ratios result in inadequate acidity to prevent spoilage. Laboratory-scale fermentation trials with selected strains of Lactobacillus brevis and L. plantarum showed that olives fermented with pure cultures were superior to spontaneously-fermented samples. L. plantarum gave better results than L. brevis; and mixed culture of L. plantarum and L. brevis gave the best results. In pilot plant studies, the quality of olives fermented with pure cultures was not markedly different from that of control samples. Effects of processing conditions (washing with acidified water, incorporation of glucose in the brine) on lactic fermentation of olives are briefly discussed. AJDW

147

Lactic acid fermentation of olives with special reference to California conditions. [Lecture]
Vaughn, R. H.
pp. 307-323 (1975) [38 ref. En] [Dept. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

This review-type paper describes the present state of the science and technology of the lactic acid fermentation of olives in California. Changes in the microflora during primary, intermediate and final stages of fermentation are discussed. Lactic acid bacteria predominate in the intermediate phase and include a mixture of the low-acid-tolerant species of Leuconostoc and the high-acid-tolerant species of Lactobacillus. In the final stage the lactobacilli completely replace the Leuconostoc spp. The most important species found to predominate in Sevillano fermentations were Leuconostoc mesenteroides, Lactobacillus plantarum and Lactobacillus brevis. Fermentation may be accelerated by incubation at 21-24°C, addition of starter and fermentable sugar and most importantly by maintenance of anaerobic or nearly anaerobic conditions. Recent studies have been focused on antibacterial substances, particularly the glycoside oleuropein and its phenolic aglycone, present in olives and means of decreasing their activity. Green olives lose much of their bitterness when stored for several months in a salt-free environment. After repacking with the proper salt brine they have very good organoleptic properties.
CRI

148

Factors influencing the growth of lactic acid bacteria during the fermentation of brined cucumbers. [Lecture]
Etchells, J. L.; Fleming, H. P.; Bell, T. A.
pp. 281-305 (1975) [42 ref. En] [Dept. of Food Sci., North Carolina St. Univ., Raleigh, North Carolina 27607, USA]

This review covers aspects of the quality control of the fermentation of cucumbers brined in bulk containers. The work is discussed under the following headings: factors affecting the lactic acid fermentation of cucumbers, brining and environmental conditions, microbial populations and interactions, properties of the brined cucumbers and pure culture fermentation studies. A flow sheet outlines and briefly describes the important steps taken to overcome the complexity of variables involved in the control of bulk

fermentation. Comprehensive tables and graphs are included. A prompt, vigorous lactic acid fermentation, favoured by the introduction of starter cultures, with the control of undesirable microbial activity and fermentation gases is suggested. CRI

149

Occurrence and effects of lactic acid bacteria in the sugar industry. [Lecture]
Tilbury, R. H.
pp. 177-191 (1975) [31 ref. En] [Tate & Lyle Ltd., Group Res. & Development, Univ. of Reading, PO Box 68, Reading, Berkshire, UK]

This paper discusses the occurrence and effects of lactic acid bacteria in sugar production from harvest to the final product. The properties of lactic acid bacteria which favour their growth in sugar processes are described. Their growth may cause loss of sucrose and the formation of polysaccharides resulting in harmful physical effects on the process. The microbiology of harvested sugar cane is discussed, in particular the harmful economic effects of Leuconostoc mesenteroides biodeterioration of the cane. The beneficial effect of lactobacilli on the production of acids and esters in 'heavy' rums from molasses fermentation is mentioned. Microbiological problems in beet sugar manufacture are largely confined to the beet processing stages. Problems caused by lactic acid bacteria in the refining of sugar are discussed. CRI

150

Continuous fermentation in pasta filata. [Lecture]
Bottazzi, V.
Dairy and Ice Cream Field **158** (5) 59, 61-63 (1975) [4 ref. En] [Inst. of Microbiology, Catholic Univ. of the Sacred Heart, Piacenza, Italy]

In this lecture presented at the 11th annual Marschall invitational Italian cheese seminar at Madison, the author deals particularly with industrial production of pasta filata cheese (Mozzarella, Fior di Latte, Ovuli, Provature etc.), using milk fermentation with periodic or continuous discharge from the fermentation vessel. In the continuous process the coagulation of milk (eg. by a Streptococcus thermophilus starter) and syneresis are accomplished as the product passes through a spiral tube of a certain length and diam. The curd at pH 5.7-5.8 is cooled and stretched. Mozzarella cheese of extended storage life may be produced by stretching the curd with heating to destroy all lactic microflora and inactivate enzymes, followed by aseptic packaging. FL

151

The influence of Lactobacillus bulgaricus on commercial Swiss cheese. [Lecture]
Biede, S. L.; Reinbold, G. W.; Hammond, E. G.
Journal of Dairy Science **58** (5) 787 (1975) [En] [Iowa St. Univ., Ames, Iowa, USA]

Increased additions of L. bulgaricus were associated with decreased numbers of propionibacteria and lower 24-h in the cheese; production of diacetyl and proline was enhanced, that of propionic and acetic acids slightly retarded, proteolysis was increased and most flavour characteristics were strengthened. CDP

152

The effect of lactic acid bacteria and direct addition of acids on the microflora of colostrum. [Lecture]
Collins, J. A.; Patrick, T. E.
Journal of Dairy Science **58** (5) 788 (1975) [En] [Univ. of Arkansas, Fayetteville, Arkansas, USA]

Tests indicated that acidification with lactic or acetic acid and/or added Hansen's culture 253 of Lactobacillus acidophilus 3067 would be beneficial in reducing undesirable microflora in fermented colostrum. Citric, hydrochloric and phosphoric acids had no such effect. CDP

153

[Effect of storage conditions on the quality of liquid starters.]
Shirokova, L. N.
Molochnaya Promyshlennost' No. 4, 18-21, 46 (1975) [5 ref. Ru] [Leningradskoe Otdelenie Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

3 smetana and 3 tvorog mixed starters, consisting of Streptococcus lactis (10-20%), Str. cremoris (50-60%) and Str. acetoinicus (30-40%) strains, were stored at 2 different temp. for 15 days, and tested at 5-day intervals for acidity, presence of diacetyl and acetoin, and viability of the bacteria. At 4°C, the cultures retained their activity, capacity to produce diacetyl and acetoin, and viability for 15 days, whereas at room temp. (18-20°C) a rapid deterioration of all these characteristics was noted at 5 days. This finding should be taken into account when the starters are transported. FL

154

Lactic acid bacteria and flavour in cheese. [Lecture]
Law, B. A.; Sharpe, M. E.
pp. 233-243 (1975) [18 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading, UK]

Cheesemaking experiments using single-strain starter or δ-gluconic acid lactone (GAL) instead of starter showed that only starter lactic acid bacteria had a clearly-defined role in Cheddar flavour development. A comparison of levels of free amino acids in cheeses made with GAL, starter or GAL + crude starter extract (containing dipeptidase) confirmed that production of free amino acids was largely the result of starter action. Starter counts in the GAL cheeses containing enzyme extract were about 10^6/g initially and 100/g after 6 months (vs. 10^9 and 10^4/g in starter cheeses); it could not, therefore, be assumed that the enzyme alone was necessary for cheese ripening since the viable starter cells still present may also have contributed to the process. CDP

155

Lactic acid bacteria in marinated herring. [Lecture]
Blood, R. M.
pp. 195-208 (1975) [31 ref. En] [British Food Manufacturing Ind. Res. Assoc., Leatherhead, Surrey, UK]

This review-type paper investigates lactic acid bacteria isolated from marinated herring packs stored at 21°C. These were identified as Lactobacillus brevis, streptobacteria and Pediococcus cerevisiae, and characteristics of the organisms are tabulated. 2 types of spoilage can occur; carbohydrate swell characterized by production of CO_2 or CO_2 and H_2 from fermentation of sugars, and protein swell characterized by production of CO_2 from decarboxylation of amino acids in the absence of fermentable carbohydrate. Factors affecting the growth of lactobacilli and the decarboxylation of amino acids in marinades are discussed. Retail packs of marinades were stored at 2°C and 21°C and examined microbiologically and chemically. Results are tabulated and microbial growth curves given. No microbial growth was detected in samples stored at 2°C. It is concluded that the maintenance of low temp. storage appears to be the only effective means of inhibiting bacterial growth in commercial prepared marinades.
CRI

156

Effect of lactobacilli and carbon dioxide on the growth of Microbacterium thermosphactum on fresh beef.
Roth, L. A.; Clark, D. S.
Canadian Journal of Microbiology **21** (5) 629-632 (1975) [14 ref. En, fr] [Div. of Biol. Sci., Nat. Res. Council of Canada, Ottawa, Canada K1A OR6]

Studies with artificially-inoculated fresh beef showed that lactobacilli markedly restrict the growth of Microbacterium thermosphactum on vacuum-packaged beef. High concn. of CO_2 (≤75%) had little effect on growth of M. thermosphactum under either aerobic or anaerobic conditions. Tests were made with samples of lean beef inoculated with pure cultures of lactobacilli and/or M. thermosphactum, and stored unpackaged in air, air + CO_2 or N_2 + CO_2, or vacuum-packaged as in commercial practice. On vacuum-packaged beef, growth of M. thermosphactum was extensive in the absence of lactobacilli, but restricted in the presence of lactobacilli. On unpackaged meat stored in air this inhibition did not occur, showing that anaerobic conditions are necessary. These results show the importance of lactobacilli for the storage life of vacuum-packaged fresh beef. AS

157

[Psychrotrophic bacteria in packaged and refrigerated meat.]
Cantoni, C.; Bianchi, M. A.; Beretta, G.
Archivio Veterinario Italiano **26** (1/2) 1-17 (1975) [many ref. It, en, fr] [Istituto di Ispezione degli Alimenti di Origine Animale, Fac. di Vet., Univ. degli Studi di Milano, Milan, Italy]

Studies on the effect of temp. on the growth rate of 5 strains of (i) Corynebacterium spp. and 5 strains of (ii) Lactobacillus spp. (isolated from vacuum-packaged refrigerated meat) are described. The bacteria were cultured in broth at 1° or 5°C for ≤60 days. At intervals, the bacterial growth was evaluated by detn. of the extinction value of the broth at 660 nm. Tables of results are given. Both (i) and (ii) grew more rapidly at 5°C than at 1°C; this effect was more marked for (i) than for (ii). One strain of (i) did not grow at 1°C and grew only slowly at 5°C; one strain of (ii) did not grow at either temp. studies. It is concluded that packaged meat must be stored at low temp., preferably -1° to +2°C. AJDW

158

Classification problems, ecology and some biochemical activities of lactobacilli of meat products. [Lecture]
Reuter, G.
pp. 221-229 (1975) [12 ref. En] [Section of Meat Hygiene, Free Univ., Berlin]

The flora of lactobacilli isolated from German meat products was investigated. Criteria were established for separation of the group of 'atypical streptobacteria' and features of typical and atypical streptobacteria tabulated. 3 subgroups consisting of 12 biotypes were identified. In the group of typical streptobacteria 5 new forms occurred including Lactobacillus farciminis and Lactobacillus alimentarius. Atypical streptobacteria showed quantities with median values of $\log_n = 8.46$ in raw sausages and 8.2 in vacuum-packed cooked sausages, whereas typical streptobacteria and heterofermenters, including leuconostocs, ranged between 5.7 and 6.6. Pediococci reached values of 7.0. In minced meat lactobacilli did not occur beyond 4.5, in cured meats not beyond 4.9. Biochemical and physiological activities relevant to classification or which might influence the technology of meat products (e.g. formation of organic acids or H_2O_2 and lipolytic and proteolytic activities) are tabulated. CRI

159

Lactic acid bacteria in fresh and cured meat. [Lecture]
Kitchell, A. G.; Shaw, B. G.
pp. 209-220 (1975) [52 ref. En] [Agric. Res. Council, Meat Res. Inst., Langford, Bristol BS18 7DY, UK]

This review-type paper investigates the enumeration and isolation problems that exist for lactic acid bacteria on meat. Special media and identification techniques are discussed. Characteristics of streptobacteria isolated from bacon are tabulated as the atypical streptobacteria are frequently the most important organisms in vacuum-packed meats, both fresh and cured. Lactic acid bacteria represent only a small fraction of the bacterial flora of unpackaged fresh meat or meat packaged in gas-permeable films. On vacuum-packaged beef, lactic acid bacteria form 50-90% of the bacterial flora, but counts are much lower for pork and lamb. Lactic acid bacterial flora of bacon is discussed. Aerobic spoilage is characterized by proteolytic and lipolytic degradation but vacuum-packed meats spoil by souring. Factors influencing the change in microflora on packaging meat in gas-impermeable films are discussed, along with the effect of smoking of cured meats. The origin of lactic acid bacteria in semi-preserved meats requires

160

[Experiments on the pickling of vegetables by inoculation with pure cultures of lactic acid bacteria.] [Lecture]
Juhasz, R. M.; Molnar, E.; Deak, T.
Konzerv-es Paprikaipar Special issue, pp. 56-61 (1974) [21 ref. Hu, ru, de] [Kerteszeti Egyetem, Budapest, Hungary]

Experiments were carried out with 4 strains (Pediococcus cerevisiae, Leuconostoc mesenteroides, Lactobacillus brevis and L. plantarum) selected from 52 bacterial strains isolated from the pickling liquors of plants processing cabbage, cucumbers and peppers. Salted raw cabbage and heat-treated commercial cucumbers in sterilized pickling liquor were inoculated. Total acids and organoleptic properties were determined in 1-3 day periods during the 14-day pickling period. Products inoculated with L. brevis had the best flavour and taste. The ratio of volatile to non-volatile acids rather than the total acids significantly affected the flavour and taste. Diagrams of acid formation during fermentation are given. In general, products pickled in liquors inoculated simultaneously with several types of pure cultures, i.e. treated with heterofermentative lactic acid bacteria, were of improved flavour and taste. [See 7 12G776.] IF

161

Polarographic assay of hydrogen peroxide accumulation in microbial cultures.
Dempsey, P. M.; O'Leary, J.; Condon, S.
Applied Microbiology **29** (2) 170-174 (1975) [9 ref. En] [Dairy & Food Microbiol. Dept., Univ. Coll., Cork, Irish Republic]

A method is described for determining low concn. of H_2O_2 using a polarographic oxygen electrode to measure the oxygen released into solution on addition of catalase. A sample can be assayed directly without prior manipulation in 3 min. The method is capable of assaying H_2O_2 at concn. as low as 7 μM. The method has proved extremely useful for the assay of H_2O_2 secreted into milk by lactic acid bacteria. AS

162

[Quality requirement for raw milk - freedom from Group B streptococci.] Anforderungen an die Beschaffenheit von Rohmilch - frei sein von B-Streptokokken.
Wiesner, H.-U.; Hübler, C.
Deutsche Tierärztliche Wochenschrift **82** (1) 17-22 (1975) [26 ref. De] [3 Hanover, Bischofsholer Damm 15, Federal Republic of Germany]

Enrichment of centrifugation sediment of milk samples on Streptosel Broth and culturing on Edwards or TKT media revealed the presence of Streptococcus agalactiae in 13 of 32 random bulk milk samples obtained during Jan.-Feb. 1973 from a herd of 100 clinically-healthy German Black Pied cows. The milk cell count of these cows, carried out regularly by the Udder Health Service was on average 250 000/ml with a SD of 85 000/ml. It is suggested that examination for presence of Group B streptococci be included in the Federal German quality requirements for raw milk. SKK

163

[Occurrence of D(-)-lactate in fermented milk, yoghurt and kefir.] Zum Vorkommen von D(-)-Laktat in Sauermilch, Joghurt und Kefir.
Wiesner, H.-U.; Stahlhut-Klipp, H.; Benner, J.
Archiv für Lebensmittelhygiene **25** (2) 49-52 (1975) [14 ref. De, en] [Inst. für Hygiene und Tech. der Milch, Tierärztliche Hochschule, Hanover, Federal Republic of Germany]

D(-)-Lactic acid constituted approx. 42% of the total lactic acid in 71 natural and 172 fruit yoghurt samples, 24% of that in 8 bioghurt samples, and <10% of that in 40 fermented milk samples; 9 kefir samples contained little or no D(-)-Lactic acid. The amounts of D(-)-Lactic acid produced were dependent on the streptococcus/lactobacillus ratio in the working culture and on the incubation time during production. 3 strains of Streptococcus thermophilus used in yoghurt production produced only L(+)-Lactic acid whereas the % of D(-)-Lactic acid in total lactic acid produced by 3 strains of Lactobacillus bulgaricus, 2 of L. acidophilus and 2 of L. bifidus ranged from 20 to 100%.

164

[Antagonistic properties of lactic streptococci.]
Akopyan, L. G.; Sarukhanyan, F. G.
Biologicheskii Zhurnal Armenii **27** (4) 17-22 (1974) [14 ref. Am, ru]

A study was made of the inhibitory activity of different strains of Streptococcus thermophilus, Str. lactis and Str. diacetilactis (isolated from dairy products and fodder grasses) towards Escherichia coli, as well as the effects of various factors (growth temp., method of starter treatment, and concn. of lactic acid) on the strains. Not all strains showed inhibitory activity. Str. lactis and Str. diacetilactis strains produced greater inhibition zones than Str. thermophilus, inhibition zones being greatest with starters stored at 7-8°C. No direct relationship was found between acid production and inhibitory activity; some strains having high acid production showed little inhibitory activity, and vice versa. Inhibitory activity was affected by growth temp. and method of starter treatment. [From Ru summ.] ADL

165

Preservation of lactic acid bacteria by freeze-drying.
Morichi, T.
JARQ [Japan Agricultural Research Quarterly] **8** (3) 171-176 (1974) [10 ref. En] [Dept. of Animal Products, Nat. Inst. of Animal Ind., Tokyo, Japan]

Str. cremoris, Str. thermophilus and Lactobacillus bulgaricus showed max. survival after freeze-drying (84-100%) when the suspending medium used was skim-milk supplemented with 0.06M glutamate, malate and arginine respectively. Investigations of the cellular injury caused by freeze-drying indicated that the majority of cells which survived in the presence of protective additives were injured to some extent, and thus required careful rehydration in order to preserve viability. After freeze-drying and storage, the acid-producing activity in skim-milk was proportional to

inoculum size up to a certain level ($10^{7.5}$/ml for Str. lactis). Influence of nature of the organism, harvesting medium, culture age, cell concn., suspending medium, moisture content, temp. of storage, O_2, amino-carbonyl reaction, and rehydration on preservation of freeze-dried lactic acid bacteria are briefly discussed. CDP

166

[Studies on production of flavour constituents by various lactic acid bacteria. I. Effect of milk fat on formation of lactic acid, non-protein nitrogen, amino nitrogen and free volatile fatty acids by various lactic acid bacteria.]
Yu, J. H.; Nakanishi, T.; Suyama, K.
Japanese Journal of Dairy Science [Rakuno Kagaku no Kenkyu] **23** (6) A195-A202 (1974) [10 ref. Ja, en] [Lab. of Chem. and Tech. of Animal Products, Fac. of Agric., Tohoku Univ., Sendai, Japan]

Lactobacillus bulgaricus, Streptococcus thermophilus, L. acidophilus (each incubated at 37°C), Str. lactis 527, Str. cremoris and L. casei (incubated at 30°C) each showed a characteristic lactic acid producing ability in whole and skim-milk, which was not affected by presence or absence of the milk fat. Presence of milk fat had no effect on non-protein N production by L. bulgaricus, Str. lactis or Str. cremoris during 72 h incubation, but markedly increased its production by Str. thermophilus and slightly decreased its production by L. acidophilus and L. casei. Milk fat had negligible effect on amino N production; it also had no clear effect on volatile fatty acid production, which varied between strains. [From En summ.] CDP

167

[Studies on production of flavour constituents by various lactic acid bacteria. II. Effect of milk fat on formation of volatile carbonyl compounds by various lactic acid bacteria.]
Yu, J. H.; Nakanishi, T.
Japanese Journal of Dairy Science [Rakuno Kagaku no Kenkyu] **24** (1) A27-A31 (1975) [17 ref. Ja, en] [Lab. of Chem. & Tech. of Animal Products, Fac. of Agric., Tohoku Univ., Sendai, Japan]

The lactic acid bacteria described in the preceding abstr. tended to produce more volatile carbonyl compounds (VCC) in skim- than in whole-milk. The predominant VCC produced by each strain was acetaldehyde; small amounts of formaldehyde and acetone were also produced by all strains. The streptococci and (in skim-milk only) L. casei produced small amounts of diacetyl. L. acidophilus did not produce any n-pentanal, but produced more 2-heptanone than did the other lactic acid bacteria studied. [From En summ.] CDP

168

[Selection of stable stains of mesophilic lactic streptococci for use in the manufacture of cultured milk products.]
Bannikova, L. A.; Zadoyana, S. B.
Molochnaya Promyshlennost' No. 4, 15-18, 46 (1975) [5 ref. Ru] [Vses. Nauchno-issled. Molochnoi Promyshlennosti, Moscow, USSR]

Cultures of strains of Streptococcus lactis and Str. acetoinicus obtained from cultured milk starters were subcultured in sterile skim-milk every 20 days during spring, summer and autumn, being incubated at 25-26°C for 17 h and then stored at 3-5°C until the next subculturing. Each time, 20 inocula of Str. lactis were examined for acid formation and 60-100 inocula of Str. acetoinicus were examined for acid formation and formation of diacetyl and acetoin. Subcultures showing coeff. of variation of ≤10% among inocula were classified as homogeneous, those with coeff. of variation of 10-20% were classified as medium variable, and those with coeff. of variation of >20% were classified as heterogeneous. 6 of the 13 Str. lactis strains and 5 of the 14 Str. acetoinicus strains were found to be of homogeneous composition and their properties remained stable throughout the seasons. Selection of industrial cultures from among such strains is recommended. [See also FSTA (1975) **7** 3P355.] SKK

169

[Effect of antibiotics and chemotherapeutic and antiseptic preparations on morphological properties of lactic acid bacteria from cheese starters.]
Erzinkyan, L. A.; Nikolov, N. M.; Pakhlevanyan, M. Sh.; Charyan, L. M.
Biologicheskii Zhurnal Armenii 27 (4) 10-16 (1974) [11 ref. Ru, am] [Inst. Mikrobiol. AN ArmSSR, USSR]

A study was made of the effects of various concentrations of penicillin, streptomycin, oxytetracycline, chlortetracycline, phthalazol and phenol on the morphological and physiological properties (acid production and coagulum formation etc.) of strains of Lactobacillus helveticus, L. casei and Streptococcus lactis. The presence of only low concn. of these substances in milk inhibited growth and disturbed bacterial cell physiology, with a consequent reduction of acid production and dairy product quality. The L. helveticus strains studied were more resistant to penicillin and streptomycin at concn. of 0.1 IU/ml milk than were the Str. lactis or L. casei strains. In phenol-resistant strains, acid production in milk was virtually unaffected by ≤0.1% phenol, but with increasing concn. acid production was reduced, cell size increased (to >60 times normal size at 0.5% concn.) and the granular structure was destroyed. STI

170

[Use of the penicillin test in differentiation of thermophilic lactic streptococci from enterococci.]
[Lecture]
Polishchuk, N. K.; Derbinova, E. S.
pp. 29-32 (1974) [1 ref. Ru] [Moskovskii Tekh. Inst. Myasnoi i Molochnoi Promyshlennosti, Moscow, USSR]

As a result of tests using different media, on numerous strains of collection thermophilic streptococci, streptococci isolated from milk, collection enterococci, and Streptococcus bovis the following differentiation procedure is

recommended. The newly isolated strain of thermophilic lactic streptococcus is cultured on (i) a penicillin medium, (ii) hydrolysed milk at 45°C, (iii) hydrolysed milk + 6.5% NaCl, (iv) hydrolysed milk + 4% NaCl, (v) hydrolysed milk + 40% bile, and (vi) hydrolysed milk at pH 9.6, the last 4 media at 43°C. Absence of growth on the 5 other media but growth on (ii) classifies the strain as a thermophilic lactic streptococcus; even weak growth on (iv) and (v) and distinct growth on (ii) with absence of growth on (i), (iii) and (vi) classifies the strain as Str. bovis; distinct growth on (i) with formation of bacterial mass precipitate and reduction of triphenyltetrazolium chloride (TTC) classifies the strain as an enterococcal species (but not Str. faecium); and growth on (ii)-(vi) and no growth or weak growth on (i) without TTC reduction classifies the strain as Str. faecium or an atypical enterococcus variant. [See **7** 12P2683, 2684 & 2685]. SKK

171

Properties of crude ethyl ester-forming enzyme preparations from some lactic acid and psychrotrophic bacteria.
Hosono, A.; Elliott, J. A.
Journal of Dairy Science **57** (12) 1432-1437 (1974) [10 ref. En] [Food Res. Inst., Canada Dept. of Agric., Ottawa, Canada]

Crude esterase preparations were obtained from 3 strains of lactic acid bacteria and 2 of Pseudomonas spp., which had previously shown a relatively high level of esterase production [FSTA (1974) **6** 10P1433]. Optimum pH for enzyme activity was 6.5 for Lactobacillus strain 81, 7-7.5 for Str. diacetilactis ATCC 15346 and Str. lactis ML3, and 8 for Pseudomonas strains 50 and 53; optimum temp. in each case was 32°C. Enzyme activity of all strains was inhibited by Cu^{2+}, Mn^{2+} and Co^{2+}, the effects of Co^{2+} on Str. lactis ML3 and the Pseudomonas enzymes and of Cu^{2+} on Lactobacillus 81 enzyme being significant. It is suggested that these enzymes may be involved in the development of fruity flavours. CDP

172

[Effect of citric acid addition on formation of neutral carbonyl compounds by lactic streptococci.] [Lecture]
Ibragimova, A. Z.; Novotel'nov, N. V.; Shmeleva, L. I.
pp. 22-24 (1974) [3 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, Leningrad, USSR]

A starter strain of each of Streptococcus lactis and Str. cremoris and 2 of Str. diacetilactis were cultured at 30°C in sterile skim-milk in the presence of 0.2% citric acid or in its absence. Results are tabulated for total bacterial counts, titratable acidity and contents of diacetyl, acetoin, formaldehyde, acetaldehyde, propanal, methylpropanal, and pentanal + acetone in the milks after culturing for 0, 2, 4, 6, 12 and 24 h. All strains tested produced appreciable quantities of the compounds named, the quantities increasing sharply in the presence of citric acid in the medium. [See 7 12P2683, 2684 & 2685]. SKK

173

[Diacetyl production in dairy products inoculated with frozen lactic acid bacteria concentrates.]
Lacrampe, J.-L.; Weber, F.
Bulletin de l'Ecole Nationale Superieure d'Agronomie et des Industries Alimentaires **15** (1/2) 17-34 (1974) [67 ref. Fr, en]

Commercial and experimental starters, containing mixtures of Streptococcus lactis, Str. cremoris, Str. diacetilactis and Leuconostoc citrovorum, were studied. Max. production of diacetyl was obtained at an incubation temp. of 21°C and a pH of 4.35. The level of diacetyl was higher (0.90 ppm) in freshly-produced lactic curds inoculated with the experimental starters than in those inoculated with commercial starters (0.70 ppm). On storage at 5°C for 12 days, the diacetyl contents increased to 1.66 and 2.50 ppm in curd made from commercial and experimental starters respectively. After storage at 5°C for 5 days, followed by storage at 18°C, the curds rapidly lost their diacetyl contents. Increasing the initial concn. of starter significantly increased the diacetyl content of the curd. Conditions for storing the frozen conc. starter culture and for preparing inocula that give max. diacetyl production are discussed. MEG

174

[Use of lactic acid bacteria to inhibit development of adventitious microflora in cream.] [Lecture]
Novosadova, L. I.; Tsaregradskaya, I. V.
pp. 32-35 (1974) [3 ref. Ru] [Leningradskoe Otdelenie Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Leningrad, USSR]

Using the method of Patkul' & Butakova [Molochnaya Promyshlennost' (1965) No. 11, 10], 4 strains of lactic streptococci (classified as Str. lactis and Str. acetoinicus) showing antibiotic activity against proteolytic and lipolytic microorganisms common in cream were selected from among lactis streptococci strains isolated from frozen cream or cooled milk. Tests with cultures of these strains showed that added at 0.25-0.3% to cream, they reduced in 30 min the adventitious microorganisms to 1-10% of their initial numbers; and that cream frozen 20-30 min after such addition kept markedly better in frozen storage than control cream. [See 7 12P2683, 2684 & 2685]. SKK

175

[Changes in volatile components in some lactic streptococci determined by gas chromatography.]
Habaj, B.; Stepaniak, L.; Wolejszo, K.
Roczniki Instytutu Przemyslu Mleczarskiego **16** (3) 7-16 (1974) [18 ref. Pl, ru, en] [Wytwornia Czystych Kultur Mleczarskich, Olsztyn, Poland]

Studies were conducted on 10 strains of Streptococcus lactis and 10 strains of Str. diacetilactis, as well as on 2 mixed-strain cultures of identical strain composition, except that 1 culture was supplemented with Leuconostoc citrovorum 521. Leuc. citrovorum caused a considerable decrease of acetaldehyde in the culture, thus contributing to the improvement of flavour

characteristics in that mixture. Acetaldehyde, ethanol, acetone and diacetyl were produced both by Str. lactis and Str. diacetilactis strains. Str. lactis strains showed much higher capacities to reduce acetaldehyde to ethanol than did Str. diacetilactis. This characteristic is to be regarded as a differentiating one for these 2 species and it should be taken into consideration when evaluating strains and composing mixed-strain cultures. A procedure was used in which cultures were heated to 70°C and the vapours were analysed by GLC. This method enables a rapid qualitative and approximately quantitative determination of volatile components in any 1 strain or in a mixed-strain culture, as well as a more precise characterization of strain balance. AS

176

[Differentiation of lactic streptococci and enterococci.]

Polishchuk, P. K.

Molochnaya Promyshlennost' No. 12, 16-18 (1973) [9 ref. Ru] [Moskovskii Tekhnologicheskii Inst., Myasnoi i Molochnoi Promyshlennosti, Moscow, USSR]

67 strains of streptococci were examined for growth in the ZhSDE medium containing penicillin [See Molochnaya Promyshlennost' (1969) 30 (4) 16-18]; at 45°C; at pH 9.6; in 6.5% NaCl; and in 40% bile. It is concluded that for differentiation of lactic streptococci from enterococci, the ZhSDE medium is sufficient as enterococci grow well in it and lactic streptococci fail to grow. For investigation of newly isolated strains, 24-h culturing in the ZhSDE medium; and at pH 9.6, and in 6.5% NaCl for 48 h at 43°C is recommended; strains failing to grow in all 3 media being classified as lactic streptococci, and those failing to grow in the first 2 media being classified as Streptococcus bovis. SKK

177

[Physiological and cultural characteristics of associations of thermophilic lactic acid bacteria and Penicillium roqueforti.]

Salvadori, P.; Bianchi-Salvadori, B.; Gower, G.

Industria del Latte **10** (3/4) 23-37 (1974) [20 ref. It, en] [Centro Sperimentale del Latte, Milan, Italy]

Experiments were made to show that proteolytic activity of P. roqueforti is stimulated by Lactobacillus bulgaricus and Streptococcus thermophilus used as Gorgonzola starters. It was found that L. bulgaricus hydrolysis the casein, liberating peptides of low mol. wt., which stimulate proteolysis by P. roqueforti. The stimulating effect of L. bulgaricus was greater when cultivated alone than when cultivated in association with Str. thermophilus. ADL

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FAB 31

LACTIC ACID BACTERIA IN BEVERAGES AND FOOD

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H. BROOKES

ASSISTANT EDITOR

1

[Isolation and characteristics of Streptococcus thermophilus and Lactobacillus helveticus phages from Emmental starters.]
Sozzi, T.; Maret, R.
Lait **55** (545/546) 269-288 (1975) [16 ref. Fr, en] [Societe d'Assistance Tech. pour Produits Nestle SA, Lab. Industriel, 1350 Orbe, Switzerland]

2 phages, specific for Str. thermophilus S265 and L. helveticus L112 respectively, were isolated from Emmental cheese whey. Of 23 other strains of Str. thermophilus tested, only one was susceptible to phage S265. Of 5 other strains of L. helveticus tested, none was lysed by phage L112. Phage S265 was destroyed in 30 min at 65°C, 10 min at 72°C and 20 s at 90°C. Phage L112 survived 1 h at 65°C (with a big drop in number) but was destroyed in 1 h at 72°C and 20 s at 90°C. Phage S265 multiplied at all growth temp. of the host strain. Phage L112 multiplied only at 28-45°C, although the host grew at 24-50°C. Below pH 3 and above pH 11, phage S265 was destroyed in 60 min but phage L112 only after 7 days. The min. pH for growth was 5 for phage S265 and 4.5 for phage L112. Active Cl in 500 ppm concn. killed both phages in 5 min. Calcium was needed for growth of phage S265 but not L112. Morphologically, phage S265 was Bradley type B and L112 was type A. ADL

2

Recovery of streptococci from a variety of foods: comparison of several media.
Oblinger, J. L.
Journal of Milk and Food Technology 38 (6) 323-326 (1975) [8 ref. En] [Food Sci. Dep., Univ. of Florida, Gainesville, Florida 32611, USA]

4 liquid and 5 solid media used to isolate and/or enumerate streptococci were evaluated using 30 food samples [including meat, fish, vegetables and dairy products]. Streptococci were recovered from all the samples surveyed. Azide Blood agar gave the highest recovery of streptococci and also allowed observation of haemolytic reactions. Streptosel, KF Streptococcus, and m-Enterococcus agars were also used, with the latter giving the lowest recovery among the agars. Azide Dextrose, KF, and Streptosel broths gave similar recoveries from most samples. Confirmation of Azide Dextrose isolates in Ethyl Violet Azide broth lowered streptococcal estimates by several log cycles. When isolates from both agar and broth cultures were subjected to further testing, Lactobacillus and Staphylococcus were often encountered, thus indicating the need to confirm representative colonies even if they are from selective media. AS

3

Growth of microorganisms in chilled orange juice.
Murdock, D. I.; Hatcher, W. S., Jr.
Journal of Milk and Food Technology **38** (7) 393-396 (1975) [9 ref. En] [Coca-Cola Co. Foods Div., Plymouth, Florida 32768, USA]

1

Growth of lactic acid bacteria and yeasts in chilled orange juice was investigated. 3 suspensions were prepared, each consisting of 4 strains of Lactobacillus, 4 of Leuconostoc, and 4 of yeast. Each composite suspension was inoculated into a series of bottles containing sterile prechilled orange juice to obtain a final concn. of 1100 and 1000 organisms/ml. Samples were stored at 35, 40, 45, and 50°F and plated periodically throughout the test period. Yeasts grew at all temp. investigated, rates of growth increasing with temp. Lactobacillus grew at 50°F but not at 45°F or below. Leuconostoc strains did not grow at 35°F but grew slowly at 40°F and rapidly at 45°F and 50°F. Fermentation by yeasts, depending on level of inoculation, occurred in 1 wk or less at 50°F and in 1-2 wk at 45°F. At 35 and 40°F it occurred in 3 wk but was satisfactory at 35°F for the lowest level of inoculation. Spoilage from growth of Lactobacillus was detected between 1 and 2 wk at 50°F. It did not occur at 45°F or below. Leuconostoc required 13 days-5 wk at 40, 45, and 50°F. Spoilage did not occur at 35°F. Shelf-life of chilled orange juice is dependent upon initial microbial population at time of packaging and temp. maintained until it reaches the consumer. AS

4

[New method of isolating lactic fermentation bacteria from wine.]
Rabinovich, Z. D.
Sadovodstvo, Vinogradarstvo i Vinodelie Moldavii **30** (4) 28-29 (1975) [Ru] [Vses. Nauchno-issled. Inst. Vinodeliya i Vinogradarstva "Magarach", USSR]

A quick method was developed to isolate lactic fermentation bacteria from a mixture of wine microorganisms. The cultivation medium is based on malt mash, containing 3% DM. To reduce yeast proliferation, an antibiotic preparation (nistatin) having a fungicidal effect is used. pH of the medium is 3.8-4.0. Cultivation takes place under anaerobic conditions to reduce the growth of acetic fermentation bacteria. 0.5 ml of wine is added to the prepared medium and a 2% solution of agar is added to the mixture, which is then incubated at 27°C. Homofermentative cocci appear after 2-4 days, and heterofermentative cocci after 5-6 days. STI

5

[Process for quick fermentation.] Verfahren zur Schnellvergärung.
Göbel, A.
German Federal Republic Patent Application 2 353 780 (1975) [De]

The speed of lactic acid fermentation of fruit, vegetable and plant juices is increased to prevent colour or vitamin decomposition or change of taste in a process in which a concentrate of lactic acid bacteria is added to juice obtained in the usual way to give an inoculum of 5-20 × 10^9/cm^3 juice

(preferably 10-20 × 10^9/cm^3). Fermentation then takes place for 50-90 min at a temp. of 36-38°C, causing the pH to decrease to 4.0-4.2, at which point fermentation is stopped by cooling or pasteurization. The process may be carried out either by placing the juice and bacteria in the bottles in which it is to be sold, and passing these through a tunnel where the temp. is 36-38°C for fermentation and 80°C for pasteurization, or by carrying out the fermentation in a container, removing and centrifuging the fermented juice and re-employing at least some of the lactic acid bacteria separated by this process for fermentation of a further batch of juice. W&Co

6

Inhibition of Streptococcus lactis and Salmonella typhimurium by mixtures of some volatile and non-volatile compounds associated with milk.
Kulshrestha, D. C.; Marth, E. H.
Journal of Milk and Food Technology **38** (3) 138-141 (1975) [27 ref. En] [Dept. of Food Sci., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Various combinations of fatty acids (C1-C10), amines and/or aldehydes and ketones were tested at concn. likely to be present in milk for their effect on growth of Str. lactis in APT broth (Difco) and Salm. typhimurium in nutrient broth (Difco). Fatty acid blends at 1000 and 100 ppm, and in most cases also at 10 ppm, significantly inhibited ($P < 0.05$) growth of Str. lactis; Salm. typhimurium was completely inactivated within 2 h by 1000 ppm fatty acids, and significantly inhibited ($P < 0.05$) by 100 ppm. Blends of amines (5 ppm) and of aldehydes and ketones (10 ppm) were more inhibitory to Salm. typhimurium than to Str. lactis, whilst mixtures of all 3 groups of compounds were inhibitory ($P < 0.05$) to both organisms. Results are discussed with particular reference to the role of volatile and other compounds in controlling growth and activity of bacteria in milk. [See also FSTA (1975) **7** 6P1396, 6P1398.] CDP

7

Studies on batch production of bacterial concentrates from mixed species lactic starters.
Pettersson, H.-E.
Applied Microbiology **29** (2) 133-140 (1975) [24 ref. En] [Div. of Tech. Microbiol., Univ. of Lund, S-230 53 Alnarp, Sweden]

Optimum growth conditions for mixed species starters FDs 0172 [Streptococcus cremoris, Str. lactis, Str. diacetilactis and Leuconostoc citrovorum] at constant pH in skim-milk, whey, and tryptone medium were investigated. Growth rate and max. population were optimal at 30°C. pH values between 5.5 and 7.0 did not influence growth rate and max. population. Lactic acid-producing activity declined rapidly after the exponential growth phase. Bacterial balance was influenced by the growth parameters: media, pH, temp. and neutralizer. Skim-milk or whey medium at 25°C, pH 6.5, and neutralized with 20% NH_4OH kept the bacterial balance almost constant throughout the cultivation. When grown in tryptone medium at constant pH, changes in bacterial balance and other metabolic activities were striking compared to the other 2 media tested. The effect of lactate as an inhibitor was complex, changing with the growth conditions. Concentrates made from mixed species starters FDs 0172, FD 0570, CH 0170, CHs 0170, and T 27 were comparable to controls when cultivated at the optimum conditions and then centrifuged. Aroma and CO_2 production, and proteolytic activity, did not differ significantly from controls when starters were cultivated at optimum conditions in skim-milk or whey medium. AS

8

Growth of a mixed species lactic starter in a continuous "pH-stat" fermentor.
Pettersson, H.-E.
Applied Microbiology **29** (4) 437-443 (1975) [32 ref. En] [Div. of Tech. Microbiol., Univ. of Lund, S-230 53 Alnarp, Sweden]

Optimum growth conditions for mixed species starter FDs 0172 [Streptococcus lactis, Str. cremoris, Str. diacetilactis and Leuconostoc citrovorum] in skim-milk, whey medium, and tryptone medium at 25°C in a "pH-stat" continuous fermentor were investigated. Specific growth rate and productivity were influenced both by the medium and the pH. Highest productivity was found in skim-milk medium between pH 5.5 and 5.9. Lactic acid-producing activity of harvested cells decreased during continuous cultivation at pH lower than 5.9 to 6.1, especially in tryptone and whey medium. Bacterial balance, CO_2 production, and aroma formation were comparable to the control in skim-milk and whey medium at any pH, but differed significantly for cells grown in tryptone medium. AS

9

[Behaviour and role of starter streptococci in Camembert cheesemaking.]
Martley, F. G.
Lait **55** (545/546) 310-323 (1975) [20 ref. Fr, en] [Sta. Centrale de Recherches Laitieres, INRA, 78350, Jouy-en-Josas, France]

Pure cultures of Streptococcus cremoris AM2 and Str. lactis ML8 were used in experimental Camembert cheesemaking. Max. populations of $\geq 10^{10}$/g DM were obtained in the curd when either strain was inoculated in milk at 32°C or when strain ML8 was inoculated at 37°C. The cheeses were of poor organoleptic quality, being very bitter. Max. populations were about 10 times smaller when strain AM2 was inoculated at 37°C or when the starter was deliberately contaminated with a bacteriophage; this reduced or eliminated the

bitterness and improved organoleptic quality. It is pointed out that these findings support the hypothesis of Lowrie & Lawrence [see FSTA (1972) 4 12P1889, 1890, 1891, 1892] concerning the development of bitterness in cheese, but the effect of rennet on bitterness seems less marked in Camembert than in Cheddar; the proteolytic activity of the surface mould flora of Camembert may play the major role in producing non-bitter precursors, which are then degraded to bitter peptides by the proteases of the lactic streptococci. ADL

10

The behaviour and role of starter streptococci in Camembert cheesemaking.
Martley, F. G.
New Zealand Journal of Dairy Science and Technology 10 (1) 12-17 (1975) [19 ref. En] [Sta. Centrale de Rech. Laitieres, INRA, 78350 Jouy-en-Josas, France]
(See preceding abstr.)

11

The effect of freeze-drying on variability and activity of lactic streptococci cultures.
El-Sadek, G. M.; Shehata, A. E.; Hassan, A. A.; El-Tobgi, H. A.
Egyptian Journal of Dairy Science 3 (1) 38-42 (1975) [9 ref. En, ar] [Food Sci. Dept., Fac. of Agric., Ain Shams Univ., Cairo, Egypt]

Single strain cultures of Streptococcus lactis and Str. cremoris isolated from different local dairy products were selected. Survival of lactic streptococci to freeze-drying followed by storage under refrigeration for up to 16 wk varied from 1.7% to 60.9% of the population depending upon the type of organism and the length of the storage period. Also, a gradual and progressive reduction in the activity of these freeze-dried cultures was observed throughout the storage period. Str. lactis cultures showed a greater ability to endure freeze-drying and maintained better activity during storage than those of Str. cremoris. AS

12

[Characteristics and distribution of pediococci in various Italian cheeses.]
Dellaglio, F.; Bottazzi, V.; Battistotti, B.
Annali di Microbiologia ed Enzimologia 24, 325-334 (1974) [23 ref. It, en] [Istituti di Microbiol. Agraria e Microbiol. Lattiero-Casearia, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

Pediococci were isolated from Grana (Parmigiano-Reggiano and Padano) and from Provolone and Pecorino cheeses at 30°C under anaerobic conditions in TGE media by subculturing colonies showing diplococci or treated grouping of cells. For purposes of identification these organisms were compared morphologically, physiologically and for DNA base composition with representatives of 7 species of pediococci from type collections. The predominant species in Grana was identified as Pediococcus acidilactici, and in Provolone and Pecorino as P. cerevisiae. Neither was present in great numbers, counts being usually $<10^4$/g in Grana and from 0 to 10^6/g in Provolone and Pecorino. Presence of pediococci in relatively high numbers appears to be associated with reduced tendency of the cheese to develop 'blowing'. GTP

13

Application of ion exchangers in removal of lactic acid from medium during cultivation of milk bacteria.
Rymaszewskii, J.; Kornacki, K.; Kramkowska, A.
Acta Alimentaria Polonica 1 (1) 21-32 (1975) [19 ref. En, pl] [Inst. Inzynierii i Biotech. Zywonosci, Akademia Rolniczo-Techniczna, Olsztyn, Poland]

In preliminary studies [See FSTA (1975) 7 8G468] effects of whey medium composition on biomass yield of Streptococcus lactis T_1 was investigated using NH_4OH to neutralize the lactic acid formed; in the present studies, the lactic acid was removed by continuous anion exchange with Wofatyt SBR. Composition of the medium had a greater effect on fermentative activity of Str. lactis than had the method of neutralization; activity was lowest in protein-free whey and highest in whey prepared from pepsin- or papain-hydrolysed milk. Fermentative activity generally approximated that observed when NH_4OH was used to neutralize the lactic acid, but proteolytic activity was approx. 30% lower. Results suggested that the optimum medium for yield and activity ofStr. lactis biomass was whey from papain-hydrolysed milk enriched with small amounts of phosphates. CDP

14

Identification of a growth factor in tomato juice for a newly isolated strain of Pediococcus cerevisiae.
Eto, M.; Nakagawa, A.
Journal of the Institute of Brewing 81 (3) 232-236 (1975) [22 ref. En] [Central Res. Lab., Asahi Breweries Ltd., Oota-ku, Tokyo 143, Japan]

A newly isolated strain (L-73) of P. cerevisiae showed very slow growth in the Nakagawa medium which has been routinely used for detection of lactic acid bacteria in the brewery. When the Nakagawa medium was enriched with 2% tomato juice extract, or when the medium was prepared with the use of unhopped beer, strain L-73 showed good growth. The growth-stimulating factor in tomato juice was purified by chromatography on a charcoal column and it was finally identified by bio-autography as 4'-O-(β-D-glucopyranosyl)-D-pantothenic acid. AS

15

An immunological study of some lactobacilli which cause beer spoilage.
Dolezil, L.; Kirsop, B. H.
Journal of the Institute of Brewing **81** (4) 281-286 (1975) [20 ref. En] [Brewing Ind. Res. Foundation, Nutfield, Surrey, UK]

Antisera have been prepared using Lactobacillus brevis, L. casei var. alactosus and L. casei var. rhamnosus. Interaction between these and acid-soluble antigens of a range of Lactobacillus strains, most of which were isolated from beer, was studied using a gel diffusion precipitin test; the fluorescent antibody staining technique was used to observe the reaction between whole cells and antisera. Gel diffusion demonstrated the presence of specific, group and non-specific antibodies. Thus, each antiserum contained a specific antibody towards the organism used to produce the antiserum and towards others in the same taxonomic unit and a non-specific antibody reacting with antigens from each of the strains of Lactobacillus and also with cells of Pediococcus cerevisiae and Saccharomaces cerevisiae. Additionally, a serum prepared against L. casei var. rhamnosus contained a group antibody which reacted with an antigen present in Streptobacteria but not in Betabacteria, whilst an antiserum made using L. brevis contained group antibodies reacting with L. brevis and L. plantarum. Fluorescent antibody staining confirmed these distinctions and, using adsorbed sera, allowed rapid identification of lactobacilli which cause beer spoilage. AS

16

[Rapid detection of beer spoilage organisms.]
Schnellbestimmung von Bierschädlingen.
Nakagawa, A.
Brauwelt **115** (38) 1247-1248 (1975) [5 ref. De, en] [Zentral Forschungslab., Asahi Breweries Ltd., 1 Kyobashi, 3-Chrome, Chuo-Ku, Tokyo, Japan]

The composition and use of the Nakagawa selective medium for detn. of beer-spoiling lactic acid bacteria are described. The modifications (adjustment to pH 6.5, incubation at 35°C) suggested by Grunenberg [see FSTA (1975) **7** 6H803] are criticized. TUB-IGB

17

Production of nisin by Streptococcus lactis strains after freezing.
Oberman, H.; Kasperkiewicz, T.; Lysiak, B.
Acta Alimentaria Polonica **1** (1) 53-62 (1975) [11 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiologii Politechnika, Lodz, Poland]

Frozen concentrates of nisin-producing strains of Str. lactis were prepared from cells grown in modified Hurst medium, and in milk- and whey-based media, harvested at the beginning of the stationary phase of growth, and suspended in milk neutralized to pH 7 and supplemented with 1% sodium citrate. They retained satisfactory viability and acidification and nisin-producing properties for ≥42 days at -20° or -15°C, but did not recover any nisin-producing activity that had been lost before freezing. Survival was greater in concentrates containing $\leq 10^{11}$ bacteria/g than in those containing 10^{13}/g (52% vs. 16-39% after 21 days at -20°C). CDP

18

Role of enterococci in Cheddar cheese: free fatty acid appearance and citric acid utilization.
Jensen, J. P.; Reinbold, G. W.; Washam, C. J.; Vedamuthu, E. R.
Journal of Milk and Food Technology **38** (2) 78-83 (1975) [28 ref. En] [Dep. of Food Tech., Iowa State Univ., Ames, Iowa 50010, USA]

2 strains each of Streptococcus faecalis and Str. durans were used to supplement starters in Cheddar cheese manufacture as described previously [FSTA (1974) **6** 8P1177]. No significant differences were found between air- and brine-cooled cheeses. Higher levels of free fatty acids (FFA) were detected during ripening at 12.8° than at 7.2°C in all cheeses, but over the whole ripening period the experimental cheeses, particularly those made with Str. durans, contained more FFA than did controls manufactured without enterococci. Citrate was utilized more rapidly at 12.8° than at 7.2°C, and stabilized in control cheeses after 60 and 90 days of ripening at the 2 temp. respectively. In cheeses containing Str. faecalis, citrate continued to decrease slightly between days 60 and 180 of ripening at 12.8°C, whilst in those containing Str. durans, it decreased steadily throughout the 180 days of ripening; 1 strain of Str. durans produced such an excess of gas at 12.8°C compared with the control that there was a definite 'blowing' effect. CDP

19

Role of enterococci in Cheddar cheese: organoleptic considerations.
Jensen, J. P.; Reinbold, G. W.; Washam, C. J.; Vedamuthu, E. R.
Journal of Milk and Food Technology **38** (3) 142-145 (1975) [29 ref. En] [Dep. of Food Tech., Iowa State Univ., Ames, Iowa 50010, USA]

Cheeses manufactured as described in the preceding abstr. were evaluated organoleptically when approx. 9 months old. 2 of the 4 lots of cheese made with Streptococcus faecalis had significantly lower scores ($P < 0.01$) than their corresponding controls, mainly due to excess acidity and bitterness at 7.2°C and fermented and unclean flavours at 12.8°C. The 4 lots of cheese made with Str. durans scored significantly higher ($P < 0.01$) than corresponding controls; they were criticized for acidity, but were less bitter and were criticized much less severely than the controls for fermented and unclean flavours. CDP

20

[Use of active cultures in biological lactic fermentation processes.]
Mitic, S.; Burzanovic, V.; Raicevic, D.
Mljekarstvo **25** (5) 111-115 (1975) [4 ref. Sh] [Inst. za Mlekarstvo, Belgrade, Mlekara Titograd, Yugoslavia]

Lactic acid bacteria (all of Yugoslav origin) used in these experiments comprised 2 Streptococcus lactis strains, Str. diacetilactis, Str. cremoris, Str. thermophilus, Lactobacillus bulgaricus and a butter and a yoghurt culture. Sterile milk was inoculated with 2% laboratory cultures (18 h old) and incubated at temp. optimal for the individual species of the bacteria; lactic acid production was measured at intervals for up to 24 h. Changes in the pH and titratable acidity and the rate of lactic acid production are tabulated for each culture. With all the cultures, the max. fermentative activity was observed at the time of milk coagulation; the rates of acidity increase during incubation varied between strains. FL

21

Distillate from milk can affect growth and activity of Streptococcus lactis.
Kulshrestha, D. C.; Marth, E. H.
Journal of Milk and Food Technology **38** (1) 20-24 (1975) [21 ref. En] [Dep. of Food Sci. & Food Res. Inst., Univ. of Wisconsin-Madison, Madison, Wisconsin 53706, USA]

Distillates were prepared from raw milk by heating at 60°, 68.3° or 76.6°C and tested for their effect on the growth and acid producing activity of a strain of Str. lactis in milks that had been heat treated for 15 min at 60-121°C. The 60°C distillate retarded growth in steamed milk, while the 68.3°C distillate retarded growth in autoclaved and pasteurized milk. The 76.6°C distillate increased the acid production of Str. lactis in steamed milk without affecting its generation time. BAL

22

The effect of agitation on the production of lactic acid by Lactobacillus bulgaricus in a casein whey medium.
Marshall, K. R.; Earle, R. L.
New Zealand Journal of Dairy Science and Technology **10** (3) 123-128 (1975) [13 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

The medium used was reconstituted casein whey powder and batch fermentations were conducted at constant pH of 6 and temp. of 46°C. Mixing intensity was varied by the use of 3 different (25, 51, 102 mm) diameter 6-bladed paddles and by changing impeller rotational speed (20-1270 rev/min). The rate of formation of lactic acid increased with increasing agitator speed (range/h of 0.84-1.69 g/l.). Above an impeller Reynolds Number ($nd^2 \rho/\mu$) of 10 000, agitation had no significant effect. Results are consisted with the view that agitation does not alter the rate of mass-transfer of nutrients to bacteria growing either as single cells or small chains. Inadequate suspension of fine protein particles is through to be the cause of decreased acid production rate at low agitation levels. AS

23

The effect of temperature on the activity of single strain starters used for non-Cheddar varieties of cheese.
Lawrence, R. C.; Heap, H. A.; Bennett, G. D.
New Zealand Journal of Dairy Science and Technology **10** (1) 18-19 (1975) [2 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

In this study of starter strains used in the manufacture of Cheshire, Feta, Gouda and Camembert cheeses, which have traditional cooking temp. of 32-35°C, 10 phage-unrelated strains of Streptococcus cremoris and Str. lactis were grown in pasteurized whole milk at 32-38°C. All strains were more active at 32° and 34°C than at 38°C, the time taken for pH to reach 5.2 ranging from 270 to 320 min at 32°C, from 285 to 355 min at 34°C, and from 310 to 535 min at 38°C. Times taken to reach pH 5.2 in pasteurized or non-pasteurized reconstituted skim-milk were generally considerably greater than in whole milk although the relative rates of the different strains remained the same. There appeared to be no advantage in using paired starter strains in the manufacture of these cheese varieties, but a long rotation of phage-unrelated single strain starters is suggested; this has been successfully applied in large-scale trials at a Cheshire cheese factory. CDP

24

[Use of proteases of microbial origin in the dairy industry. Role of the proteolytic activity of lactic acid bacteria in the occurrence of the bitter taste defect.]
Cserhati, T.; Hollo, J.
Tejipari Kutatasi Közlemenyek **16**, 32-52 (1973) [58 ref. Hu, en, ru] [Budapesti Müszaki Egyetem Mezögasdasagi Kemiai Tech. Tanszek, Hungary]

A synthetic medium was used for investigating casein breakdown by lactic acid bacteria. It was found that the bacteria decomposed α- and β-casein, but no close relationship was found between proteolysis and acid production. Protease production as a function of time was correlated with variations in cell mass. The proteases were precipitated by ethanol and ammonium sulphate in a final concn. of 70%. The enzymes were not homogeneous; the protease complexes of the various strains studied (Streptococcus lactis, Str. cremoris, Str. thermophilus, Lactobacillus helveticus and L. casei had the same electrophoretic mobility. Changes in the cell mass, pH and titratable acidity of lactic acid bacteria during incubation were not affected by calf rennet or Endothia parasitica, Mucor pusillus or Bacillus sp. enzymes. The lactic acid bacteria reduced the bitter taste caused by these enzymes. There was an antagonistic effect between the proteolytic activities of the lactic acid bacteria proteases and the milk-clotting enzymes used together. ADL

25

Influence of wine composition on the heat resistance of potential spoilage organisms.
Splittstoesser, D. F.; Lienk, L. L.; Wilkison, M.; Stamer, J. R.
Applied Microbiology **30** (3) 369-373 (1975) [12 ref. En] [New York State Agric. Exp. Sta., Cornell Univ., Geneva, New York 14456, USA]

Pasteurization studies were conducted on 29 yeasts and 5 lactic acid bacteria. In general the yeasts were more heat resistant in wine than were the bacteria. The one exception was a strain of Lactobacillus fructivorans that gave an average B-value of 1.7 min at 60°C. Alcohol was the wine constituent that had the greatest effect on resistance; D-values for all test species were inversely related to the ethanol concn. The response of organisms to other factors such as pH, sugar, and SO_2 varied with the species. AS

26

Detection of mannitol formation by bacteria.
Chalfan, Y.; Levy, R.; Mateles, R. I.
Applied Microbiology **30** (3) 476 (1975) [10 ref. En] [Lab. of Applied Microbiol., Hebrew Univ.-Hadassah Med. School, Jerusalem, Israel]

A test is described by means of which formation of mannitol from fructose by lactic acid bacteria can be readily detected. The test is based on removal of interference of residual fructose by dehydration with hydrochloric acid followed by TLC. This test has been used successfully for detection of the conversion of fructose to mannitol by a number of lactic acid bacteria obtained from Israeli wines. The mannitol-positive isolates appeared to be strains of Lactobacillus leichmanii, L. plantarum, and Streptobacterium sp., whereas mannitol-negative isolates were identified as L. brevis, Leuconostoc oenos, and Leuc. dextranicum. AS

27

An improved medium for the selective culturing of lactic acid bacteria.
Saha, R. B.; Sondag, R. J.; Middlekauff, J. E.
Proceedings. American Society of Brewing Chemists **5[?32]** (1) 9-10 (1974) [6 ref. En] [Tech. Cent., Anheuser-Busch, St. Louis, Missouri, USA]

Several media were compared for isolation and enumeration of lactobacilli in beer (often difficult because of their fastidious nutritional requirements). The routine Universal Beer Agar (UBA) was then selected as a base, and 40 different media containing various growth stimulants added to UBA were tested. All media were adjusted to pH 5.6-5.8 and all Petri dishes were incubated anaerobically. Cultures used were lactobacilli isolated from beer and pure cultures of Lactobacillus delbrueckii and L. gayonii. Criteria employed were rate of development of colonies, size of colonies and colony counts obtained. An improved medium (Raka-Ray 3 or RR-3) was finally selected; the formula (rather complex) is given. Comparisons between UBA and RR-3 are tabulated. Colony size was larger on RR-3, giving easier counting, and colony number after 4 days incubation on RR-3 were equal to numbers on UBA after 5 days. Moreover only 63.5% of eventual numbers were countable at 4 days on UBA, against 92.9% on RR-3. ELC

28

[Gas chromatographic analysis of headspace of defective beans.] In "Chimie des Cafes Verts, Torrefies et leur Derives" [see FSTA (1976) **8** 3H386]. [Lecture]
Barel, M.; Challot, F.; Hahn, D.; Vicent, J. C.
pp. 95-101 (1974) [5 ref. Fr, es, en, de] [IFCC, Lab. de Recherches de Nogent-sur-Marne, France]

Defective ('stinker') beans were warmed to 40°C for 45 min in a closed container and samples of the headspace gas were analysed by GLC. Quantitative, but not qualitative, differences were observed between chromatogram patterns from healthy and 'stinker' beans. The increase in methanol and ethanol levels in the 'stinker' beans headspace suggests that their disagreeable odour results from a lactic acid type of fermentation occurring in the beans during storage. The nature of the odour could not be established. [See **8** 3H386.] MEG

29

[Inhibition of biological degradation of acid by bound sulphurous acid.] Hemmung des biologischen Säureabbaus durch gebundene schweflige Säure.
Mayer, K.; Vetsch, U.; Pause, G.
Schweizerische Zeitschrift für Obst- und Weinbau **111** (23) 590-596 (1975) [10 ref. De] [Eidgenössische Forschungsanstalt, Wädenswil, Switzerland]

Effects were studied of bound (using acetaldehyde) and free SO_2 on survival of added adapted Leuconostoc oenos in physiological saline, nutrient medium and Blauburgunder and Clevner wines as well as on conversion of malic acid into lactic acid. Initial concn. of bound + free SO_2 were approx. 60 mg/l. for the media and 80-100 mg/l. for the wines. It is concluded from tabulated results that bound SO_2 inhibited almost completely L. oenos development and acid conversion in the wines. The findings are taken as a pointer to difficulties frequently encountered in acid degradation in wines from eastern Switzerland. In 4 wines with little or no free SO_2 but with bound SO_2 contents of 95-137 mg/l. acid degradation was delayed for >6 months or took place only after blending. SKK

30

Controlled fermenation of cucumbers.
Lingle, M.
Food Production/Management **98** (1) 10-13 (1975) [8 ref. En] [Hansen's Lab. Inc., Milwaukee, Wisconsin, USA]

Controlled fermentation, by removal of natural bacterial flora and innoculation with Lactobacillus plantarum is said to assure complete, rapid fermentation at the correct temp. (75-80°F). A step-

by-step procedure is given, covering washing, shrinking, brining in chlorinated water, acidification, purging of CO_2 (to ≤40 mg/ml), buffering, innoculation, and fermentation. The method reduces 'bloaters' by ≥25%. JRR

31

[Factors reducing baker's yeast keeping quality.]
Nikitin, G. A.; Privan, V. M.; Kravets, V. I.
Pishchevaya Promyshlennost, Respublikanskii Mezhvedomstvennyi Nauchno-tekhicheskii Sbornik No. 19, 19-21 (1974) [4 ref. Ru]

Comparative evaluation was made of the keeping quality of baker's yeast in the presence of putrefactive and lactic acid bacteria. Molasses inoculated with pure yeast cultures and lactic acid and putrefactive bacteria, and industrial yeast cream containing putrefactive and lactic acid bacteria were studied. Results show that the putrefactive bacteria considerably reduce the keeping quality. Lactic acid bacteria have practically no effect on keeping quality. Compressing enhances the keeping quality. STI

32

[Determination of Group B-streptococci (Streptococcus agalactiae) with the aid of serological methods (precipitation, fluorescent antibody technique) and the CAMP-test.]
Bestimmung der B-Streptokokken (Sc. agalactiae) mit Hilfe serologischer Methoden (Präzipitation, FA-Technik) und im CAMP-Test.
Remmers, J.
Archiv für Lebensmittelhygiene **26** (3) 104-106 (1975) [25 ref. De, en] [Inst. für Hygiene und Tech. der Milch, Tierärztliche Hochschule, Hanover, Federal Republic of Germany]

283 strains of streptococci isolated from milk were examined by (i) Pronase extraction of group-specific polysaccharide [Ederer et al., Applied Microbiology (1972) **23**, 285-288] and group identification by counter-immunoelectrophoresis [Edwards & Larson, Applied Microbiology (1973) **26**, 899-903]; and (ii) the CAMP test. Numbers of Group B strains identified by (i) and (ii) respectively were 146 and 143; 122 of the 146 Group B strains were identified as such by a fluorescent antibody method. Of 5, 77 and 23 strains identified by (i) as belonging to Groups C, D and E respectively, 0, 4 and 12 gave a positive (ii) test. Instead of Pronase B (Calbiochem) used by Ederer et al., a procedure using Pronase E (Merck) is described and recommended for routine identification of mastitis streptococci because of its lower cost. Tests with Pronase B and E gave identical results and showed in tests on 100 strains the same diagnostic accuracy as the internationally used formamide extraction method of Fuller [British Journal of Experimental Pathology (1938) **19**, 130-139]. SKK

33

[Symbiotic inoculum for cultured milk products.]
Koroleva, N. S.; Mel'nikova, E. V. **(Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti**)**
USSR Patent 467 104 (1975) [Ru]

The method comprises combined culture of thermophilic streptococci and Lactobacillus bulgaricus in milk with daily transfers until a milk clotting time of ≤3 h and a stable microflora are achieved. Before combined culturing the strains are checked for their ability to form antibiotics and acetaldehyde and for the stimulatory action of streptococcal metabolic products on development of L. bulgaricus, preferably by serial dilution of culture fluid filtrates in liquid nutrient media. After 3 h combined culturing the development of L. bulgaricus is checked microscopically and the inoculum is checked for ability to form acetaldehyde and antibiotics. The microorganisms used are preferably streptococci strains 15 and 28, obtained from citrus fruits, and L. bulgaricus strain V-1p. W&Co

34

[Relationship between vitamin-synthesizing properties and acid production in thermophilic lactic acid bacteria.]
Kalashyan, A. T.; Magakyan, A. T.
Molochnaya Promyshlennost' No. 7, 18-19 (1975) [Ru] [Proektno-Konstructorkoe Byuro Ministerstva Myasnoi i Molochnoi Promyshlennosti Armyanskoi SSR, USSR]

The vitamin-synthesizing capacity of selected strains of Streptococcus thermophilus (7 strains) and Lactobacillus helveticus (3 strains) intended for use in the manufacture of Ekhegnadzorskii cheese was studied. Tests on sterile milk showed that all the strains synthesized riboflavin, thiamin and choline but only 6 ascorbic acid. A close correlation was found between lactic acid production and the synthesis of choline and ascorbic acid by L. helveticus strains, whilst no such correlation was established for Streptococcus thermophilus. In further tests, Ekhegnadzorskii cheese made from pasteurized milk with a starter of these strains contained substantially more (twice as much) choline and riboflavin than the controls made from raw milk without starter. No appreciable increases were noted in the contents of ascorbic acid, pantothenic acid, thiamin, pyridoxine, biotin and vitamin B_{12}. FL

35

[Effect of products of thermophilic methane fermentation on a mixed culture of lactic acid bacteria.]
Mikhlin, E. D.; Khandak, R. N.; Gudkov, A. V.
Prikladnaya Biokhimiya i Mikrobiologiya **11** (4) 506-514 (1975) [19 ref. Ru, en] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Experiment were made to study the effect of thermophilic methane fermentation producs (TMFP) on the biomass accumulation and relative proportions of Streptococcus lactis, Str. cremoris, Str. diacetilactis, Str. diacetilactis subsp. acetoinicus, Leuconostoc citrovorum and Lactobacillus plantarum, cultured together in milk and in whey medium. All the streptococci species showed different rates of growth to those observed

when they were cultured separately. Str. cremoris, which had the fastest growth when cultured in isolation, was slowest in the mixed culture. Addition of TMFP to the medium increased the growth rate and biomass accumulation of all streptococci in the mixed culture and also affected the relative proportions of the different species. Thus the TMFP significantly slowed down the decrease in Str. cremoris and Leuc. citrovorum content relative to Str. lactis and Str. diacetilactis subsp. acetoinicus. When cultured with the other 5 species, L. plantarum increased relative to the other species from the beginning of fermentation in media without TMFP, but in media with TMFP the proportion of L. plantarum fell at first, reaching a min. after 6-9 h and then rose; it is suggested that the TMFP may increase the growth rate of the streptococci in the log phase and also shorten the lag phase by eliminating the inhibiting effect of products of lactobacilli metabolism. ADL

36

[Biochemical activity of bifidus bacteria in milk.]
Borisova, G. V.; Slivko, V. V.
Molochnaya Promyshlennost' No. 12, 13-15 (1973) [15 ref. Ru] [Vologodskii Molochnyi Inst., Vologda, USSR]

Biochemical activity of Lactobacillus bifidus [Bifidobacterium bifidum] during culture in sterilized milk and the possibility of using it in starters for the production of cultured milks was studied. Results given for 6 high acid-producing strains isolated from the mouth and intestines of humans show that milk coagulation occurred in 18-28 h with corresponding decreases in pH to 4.38-4.58; the amounts of volatile acids produced corresponded to 1.7-5.2 ml 0.1N NaOH/100 ml distillate. In proteolytic activity, the bacteria were comparable to lactic streptococci. On cultivation during 30 days, all 6 strains produced formaldehyde, acetaldehyde, acetone, and butanone-2. FL

37

Further studies on a growth medium for Lactobacillus sanfrancisco.
Sugihara, T. F.; Kline, L.
Journal of Milk and Food Technology **38** (11) 667-672 (1975) [6 ref. En] [W. Regional Res. Lab., USDA, Berkeley, California 94710, USA]

The medium developed for the original isolation studies on L. sanfrancisco [starter organism for San Francisco French bread] has been further refined to provide a basis for development of media for commercial preparation of cell concentrates. Addition of salts, purines, pyrimidines, and optimization of casein hydrolysate and Tween 80 levels resulted in markedly improved growth but did not eliminate the need for freshly prepared yeast extractives (FYE). Commercial yeast, liver, corn steep, and protein hydrolysate preparations tested were inadequate substitutes for the FYE. High maltose levels appear to stabilize viable counts over longer incubation periods. Some differences between strains in growth requirements were observed. Strains L and T were the least fastidious nutritionally, appeared indifferent to O_2, and had a minimal requirement for Tween 80, but a primary requirement for purines-pyrimidines. Strains B and C were inhibited by O_2 and had a primary requirement for trace element supplementation and Tween 80. Strain L which showed the most rapid and heaviest growth has been selected as the type strain and the one to be utilized in initial commercial tests as a starter culture preparation. [See also FSTA (1971) **3** 9M1053.] AS

38

[Method for detecting lysogenic cultures of lactic streptococci.]
Mytnik, L. G.
Molochnaya Promyshlennost' No. 5, 12-14, 45 (1975) [10 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

A method based on that described by I. M. Gabrilovich [Practical manual on bacteriophages (1968) 130pp. Minsk, Vysheishaya Shkhola] was used to detect lysogeny in cultures of lactic streptococci. The method involves incubating the culture at 30°C for 5-6 h, addition of 10% chloroform to the medium to release the phage, centrifuging at 4000-6000 rev/min for 20 min, mixing 0.1-1 ml of the supernatant with an indicator culture (0.1-0.3 ml) and 3-4 ml semi-liquid agar and plating on the surface of a solid agar medium. After 17-19 h at 30°C the culture is examined for the presence of 'negative' phage colonies. Of 154 strains of Streptococcus lactis, Str. acetinicus, Str. cremoris and Str. diacetlactis, 5, 2, 2 and 1 respectively were found to be lysogenic. FL

39

[Control of the growth of lactic streptococci in the preparation of bacterial concentrates.]
Vainberg, I., A.; Priidak, T. A.
Molochnaya Promyshlennost' No. 8, 13-15 (1975) [5 ref. Ru] [Vses. Nauchno-isled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

In experiments with 2 strains of Streptococcus lactis a close correlation ($r = 0.95$) was shown to exist between concn. of viable cells and optical density of cell suspensions during experimental phase of growth. Therefore the concn. of lactic streptococci during growth in suitable media may be determined by measuring optical density of cell suspension with a photoelectric colorimeter. The use of a turbidimetric method in the preparation of bacterial concentrates substantially simplifies and speeds up the control of growth and the method could provide a basis for automatic control in the production of concentrates of lactic acid bacteria. FL

40

[Effect of some factors on yoghurt quality.]
Slavchev, G.
Veterinarnomeditsinski Nauki **12** (8) 75-81 (1975) [14 ref. Bg, ru, en] [Vet. Inst. po Zarazni i Parazitni Bolesti, Sofia, Bulgaria]

Milk of cows, each given 3 daily doses of 100 000 or 200 000 IU Biovit 40 [veterinary chlortetracycline preparation] in the fodder, contained no antibiotic and did not differ in lactic acid fermentation from control milk. Examination of 20 individual samples of milk and of 4 bulk samples from 30 cows showed that in summer green fodder stimulates the rate of growth of Lactobacillus bulgaricus and Streptococcus thermophilus in milk but that succulent fodders depress the development of these organisms in winter, spring and autumn. SKK

41

[Studies on further characterization of bacteriophages active against Streptococcus lactis and Str. cremoris.] Untersuchungen zur weiteren Charakterisierung von Streptococcus lactis- und cremoris-Bakteriophagen.
Engel, G.
Kieler Milchwirtschaftliche Forschungsberichte **27** (2) 91-99 (1975) [14 ref. De, en, fr] [Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

6 strains of bacteriophages isolated from cheese whey [see FSTA (1970) **2** 10P1320] active against Str. lactis and Str. cremoris strains isolated from cheese starters [see FSTA (1973) **5** 8P1194] and belonging to 6 different taxonomic groups, were studied further. In the plaque test, their latent period at 30°C ranged from 43 to 103 min, burst sizes being 10-200 plaque-forming units. 2 of the phages were resistant to heating at 72°C for 60 s and at 65°C for 60 min, while the others showed loss of activity, 1 being particularly labile. All 6 strains inhibited acid formation in skim-milk at 30°C by the Str. lactis and Str. cremoris used; they required 3-4 multiplication cycles to destroy a streptococcal culture. SKK

42

[Lactobacilli and gas formation of film-wrapped Cheddar cheese.]
Keller, J. J.; Jaarsma, J.
South African Journal of Dairy Technology **7** (3) 183-185 (1975) [8 ref. Af, en] [Anim. & Dairy Sci. Res. Inst., Irene, Transvaal, S. Africa]

The cause of gas formation under the film of rindless Cheddar cheese was investigated. All cheeses studied contained a high concn. of heterofermentative lactobacilli (2×10^7 cells/g cheese). Experimental cheeses were contaminated artificially with either Lactobacillus buchneri (Lb) or L. viridescens (A_2). Considerable gas formation (11-30 days depending on cheese type) under the wrapper showed that heterofermentative lactobacilli were the cause of the problem. A suggested remedy is prevention of contamination and use of homofermentative lactobacilli together with the starter culture. [From En summ.] LMB

43

[Determination of vitamin B_{12} (cyanocobalamin) using Lactobacillus leichmanii.]
Cerna, J.
Prumysl Potravin **26** (8) 431-435 (1975) [23 ref. Cs] [Vyzkumny Ustav Potravinarskeho Prumyslu, Prague, Czechoslovakia]

The author's Institute was charged with the development of a L. leichmanii method for detn. of vitamin B_{12} in foods, suitable for acceptance as the method of choice by all specialized laboratories in Czechoslovakia. The results of the study using L. leichmanii ATCC 7830 are described in detail, with particular attention to procedure and to the effects of water quality, solution vol., culture medium, incubation temp., enzymic hydrolysis, identification and removal of non-specific growth factors and intefering substances, and washing of glassware on vitamin B_{12} detn. in milk products, fish, meat, cereals, yeast, etc. The method chosen was tested in 1972 in 8 Czechoslovak laboratories and was recommended by the Technical Information Centre of the Czechoslovak Agricultural Academy as a unified analytical method (JAM) from autumn 1973. SKK

44

Effects of glucosyl pantothenates on the growth of beer lactic acid bacteria.
Eto, M.; Nakagawa, A.
Bulletin of Brewing Science **20**, 37-39 (1974) [11 ref. En] [Cent. Res. Lab., Asahi Breweries Ltd., Ohta-ku, Tokyo 143, Japan]

45

Agglutination tests as an aid to the classification of pediococci [from brewery products] and aerococci.
Clausen, O. G.; Hegna, I. K.; Solberg, O.
Journal of the Institute of Brewing **81** (6) 440-443 (1975) [18 ref. En] [Inst. of Pharmacy, Univ. of Oslo, Blindern, Oslo 3, Norway]

46

Growth of microorganisms in chilled orange juice.
Murdock, D. I.; Hatcher, W. S., Jr.
Proceedings of the Florida State Horticultural Society **87**, 274-281 (1974) [9 ref. En] [Coca-Cola Co. Foods DN., Plymouth, Florida, USA]

The growth of lactic acid bacteria and yeasts in chilled orange juice was investigated. 3 suspensions were prepared, each consisting of 4 strains of Lactobacillus, 4 of Leuconostoc, and 4 of yeasts, and inoculated into sterile prechilled orange juice to a final concn. of 1, 100, and 1000 organisms/ml. The samples were stored at 35°, 40°, 45°, and 50°F, and plated periodically. The yeasts grew at all temp. investigated, their rates of growth increasing with the temp. Lactobacillus grew at 50°F but not at ≤45°F. Leuconostoc did not grow at 35°F, but

grew slowly at 40°F, and rapidly at ≥45°F. Fermentation by yeasts occurred in ≤1 wk at 50°F and in 1-2 wk at 45°F. At 35° and 40°F it occurred in 3 wk but was satisfactory at 35°F for the lowest level of inoculation. Spoilage from growth of Lactobacillus was detected between 12 days and 2 wk at 50°F but not at ≤45°F. Leuconostoc required 13 days to 5 wk at 40°, 45° and 50°F. Spoilage did not occur at 35°F. Shelf-life of chilled orange juice is dependent upon the initial microbial population at time of packaging and the temp. maintained until it reaches the consumer. AS

47

Microbial inhibition by an isolate of Pediococcus from cucumber brines.
Fleming, H. P.; Etchells, J. L.; Costilow, R. N.
Applied Microbiology **30** (6) 1040-1042 (1975) [8 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

P. cerevisiae FBB 61 has been shown to inhibit Lactobacillus plantarum FBB 67 in mixed species inoculation used for the fermentation of brined cucumbers. In this study, 16 isolates of the Pediococcus genus from various sources were tested for inhibitory activity against L. plantarum and other microorganisms by a seeded-agar screening technique. Only 2 of the 16 isolates gave consistent and distinctive zones of inhibition, and both were isolated from fermenting cucumber brines on separate occasions. These 2 isolates did not inhibit each other but did inhibit the other 14 Pediococcus isolates in addition to L. plantarum. They also inhibited several other Gram-positive bacteria, but not 4 species each of Gram-negative bacteria and yeasts tested. Inoculation of cucumber juice broth with P. cerevisiae FBB-61 and L. plantarum WSO resulted in a drastic reduction in the plate count of L. plantarum WSO during day 1, but counts increased rapidly thereafter. Consequently, acid production by L. plantarum WSO was delayed. Noninhibitory isolates of Pediococcus had no appreciable effect on growth and acid production by L. plantarum WSO. AS

48

[Effect of whey proteins in culture media on accumulation of some proteolytic products lactic streptococci.]
Krasheninin, P. F.; Zvyagintsev, V. I.; Tolkachev, A. N.; Kustova, N. N.
Molochnaya Promyshlennost' No. 8, 11-13 (1975) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Experiments investigating the degree of hydrolysis of whey proteins (precipitated by heating, acidification, acidification/alkalization, and addition of $CaCl_2$) in culture media of Uglich starter containing 3 strains of Streptococcus lactis, 2 of Str. cremoris, and 1 of Str. paracitrovorus and Str. diabetilactis and of single-strain starters were carried out. The media were prepared by reconstituting freeze-dried whey proteins in skim-milk at a rate of 2.4 and 7.5 g/l, and sterilizing for 10 min; in some cases rennet was also added. Soluble N fractions and free amino acids were determined, and the occurrence of bitter flavour evaluated organoleptically. Addition of whey proteins to the culture media with the Uglich starter substantially stimulated the hydrolysis of casein, max. amounts of bitter compounds being formed when the protein was precipitated by the $CaCl_2$ and acid/alkali methods. Using single-strain starters, particularly of Str. cremoris, greatly reduced the breakdown of casein and formation of bitter compounds. FL

49

[Bacteriological composition of some commercial starters used for Gouda cheese manufacturing.]
Mostert, J. F.; Husmann, R. A.
South African Journal of Dairy Technology **7** (3) 179-181 (1975) [14 ref. Af, en] [Anim. & Dairy Sci. Res. Inst., Irene, Transvaal, South Africa]

The bacteriological composition of 13 commercial starters used for Gouda cheese manufacturing was determined. Enumeration was done on agar medium [FSTA (1973) **5** 7P903]. Streptococcus cremoris occurred in each starter and was the dominant species (77-100% of total population). Str. lactis, Str. diacetilactis and leuconostocs were found in 8, 2 and 1 starter respectively. Comparing the results with a similar investigation a few years ago [see FSTA (1973) **5** 8P1139] a change has occurred in the bacterial population of starters used by some factories. In the present investigation Str. diacetilactis was seldom found and then only in low numbers, while Str. lactis always occurred in mixed cultures. AS

50

[Possibilities of using Lactobacillus bifidus in the manufacture of dairy products.]
Hrabova, H.
Prumysl Potravin **26** (10) 479-481 (1975) [Cs] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Various aspects of the work carried out at the Dairy Research Institute in Prague on Lactobacillus bifidus are summarized with particular reference to uses of this organism in food products. The growth and acidifying activity of L. bifidus strains isolated were very satisfactory, but the organism was very sensitive to milk quality and to some antibiotics. Its optimum cultivating temp. of 37°C presented difficulties when grown together with cream culture (23°C), but 30°C was a good compromise. Possibilities of uses include fermented milks, and tvaroh-based desserts (made with the addition of sugar, whipping cream and flavourings). Tvaroh made using a combined L. bifidus + cream culture was very similar in composition and yield to normal tvaroh and retained >98% of the microflora (total counts 10^9/g of which about 35% were L. bifidus); the decline on storage was not excessive. Tvaroh desserts made from tvaroh, whipping cream, sugar

and apricot puree using a 1:1 starter of L. bifidus and cream culture were very satisfactory on organoleptic grading and no consistency defects were noted. FL

51

Production of Cheddar cheese.
Storrs, A. B. (Lacto Products Co. Inc.)
United States Patent 3 875 305 (1975) [En]

It is claimed that the addition of a viable or inactivated culture of Streptococcus diacetilactis DRC-1 to the cheese curd in amounts of up to 100 ppm before hooping results in Cheddar cheese with improved body and flavour characteristics. EJM

52

Development and application of a method of detecting malty-flavour producing streptococci in cheese.
Langeveld, L. P. M.
Netherlands Milk and Dairy Journal **29** (2/3) 135-144 (1975) [13 ref. En, nl] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

To detect bacteria able to cause malty flavour, dilutions of cheese were inoculated into sterile milk, which was examined for malty aroma after incubation at 30°C until it curdled. The malty aroma was sometimes difficult to detect, but was greatly accentuated by the addition of 100 mg α-keto-isocaproic acid/l. milk before incubation. Malty cheeses contained at least 10^5-10^9 lactic acid bacteria/g giving malty flavour, whilst these bacteria were not detected in non-malty cheeses. Presumably the malty flavour in cheese made from pasteurized milk is caused in many cases by the development of some malty-flavour producing lactic streptococci during cheesemaking. AS

53

[Studies on injury and recovery of lactobacilli by freeze preservation.]
Imai, M.; Kato, M.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] **49** (2) 93-98 (1975) [17 ref. Ja, en]

54

[Effects of Mn^{2+} and Mg^{2+} on growth inhibition of lactic acid bacteria caused by Cd^{2+}.]
Savel, J.; Prokopova, M.
Kvasny Prumysl **21** (4) 79-80 (1975) [4 ref. Cs, ru, en, de] [Jihoceske Pivovary, n.p., Ceske Budejovice, Czechoslovakia]

The toxic effects of $CdCl_2$ on lactic acid bacteria were studied as affected by Mn and Mg salts. The results showed that the toxic effects of Cd^{2+} on their growth increased with reducing concn. of Mn^{2+} in the medium. Following addition of $MnSO_4$, the toxicity of Cd^{2+} was significantly higher for pediococci than for lactic acid bacteria, and increased considerably with decreasing concn. of Mn^{2+}. It was concluded that the toxic effects of Cd^{2+} on lactic acid bacteria are probably related to their need for Mn^{2+} for growth. STI

55

Inhibition of psychrotrophic bacteria by lactobacilli and pediococci in nonfermented refrigerated foods.
Gilliland, S. E.; Speck, M. L.
Journal of Food Science **40** (5) 903-905 (1975) [16 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

The growth in milk at 5-7°C of Pseudomonas fragi and a Gram-negative psychrotrophic isolate MC-60N was inhibited by cells of Lactobacillus bulgaricus NCS1. The growth of psychrotrophic bacteria in the natural flora of ground beef was also inhibited at 5°C by cells of L. bulgaricus, L. lactis and Pediococcus cerevisiae, which do not grow under these conditions. Cells of L. bulgaricus HWD were inhibitory to the growth of psychrotrophic bacteria in refrigerated crab meat. H_2O_2 was involved in the inhibitory action exerted by the lactobacilli. Apparently other factors were responsible for the antagonistic action produced by P. cerevisiae as H_2O_2 was not detected. IFT

56

[Medium for correct determination of lactobacilli.]
Savel, J.
Kvasny Prumysl **21** (8) 169-171 (1975) [2 ref. Cs, ru, en, de] [Jihoceske Pivovary n.p., Ceske Budejovice, Czechoslovakia]

Lactic acid bacteria in brewing materials are determined using a method able to selectively separate lactobacilli mixed with pediococci. As β-phenylethanol does not completely suppress Gram-negative bacterial growth, addition of $CdCl_2$ to the β-phenylehtanol-containing medium used is recommended; 10 mg/l. for medium without, and 5 mg/l. for medium with the -phenylethanol inhibited growth of the pediococci and in some instances somewhat reduced the number of lactobacilli. STI

57

Studies on quality and quantity of end products during Pediococcus growth and metabolism.
[Lecture]
Middlekauff, J. E.; Sondag, R.
Proceedings. American Society of Brewing Chemists pp. 17-19 (1972, publ. 1973) [8 ref. En] [Tech. Cent., Anheuser-Busch Inc., St. Louis, Missouri, USA]

Experiments with a single strain of Pediococcus known to be a beer-spoilage organism revealed that growth can be stimulated in liquid beer culture by additions of pyruvic acid. It is suspected that acetoin synthesis occurs at the expense of the normal levels of pyruvate in finished beer. Excretion of pyruvic acid in beer production is at its highest rate after 2-3 days of primary fermentation. Pediococcus produces high amounts of both diacetyl and acetoin in sterile beer culture, but only where the cell density approaches the 10^5/ml level.

Finally, it was shown that Pediococcus has the capacity to synthesize high levels of both D- and L-lactic acids during growth in beer cultures. Addition of pyruvate to beer cultures tends to increase L-lactic acid production. [See FSTA (1976) **8** 6H982.] AS

58

[Sxdies of the physiology of development of sour-dough bacteria. V. Effect of temperature on the critical pH of the sour-dough bacteria types Lactobacillus plantarum and Lactobacillus brevis.]
Studien zur physiologie der Entwicklung der Sauerteigbakterien. V. Über den Einfluss der Temperatur auf den kritischen pH-Wert von Sauerteigbakterien der Art Lactobacillus plantarum und Lb. brewis.
Spicher, G.
Getreide, Mehl und Brot **29** (12) 328-330 (1975) [7 ref. De] [Bundesforschungsanstalt für Getreideverarbeitung, Detmold, Federal Republic of Germany]

L. plantarum 288 (homofermentative) and L. brevis 397 (heterofermentative) were cultured in Mack's nutrient medium (composition given) and a study made of the effect of temp. on their critical pH and acidity of the medium at various stages of growth. At 15°, 30° and 40°C the critical pH of L. plantarum was, respectively, 4.35, 4.05 and 4.2; corresponding critical pH of L. brevis was 4.5, 4.5 and 4.65. The relationship between acidity of the medium and temp. was widely different for the 2 spp., as is also the relationship between incubation time and bacterial growth. A tendency was seen for L. brevis to grow more slowly and to continue growing for a longer time than L. plantarum. It is stated that for sour dough production it is necessary to provide conditions which maintain the required balance between these 2 bacteria. [See FSTA (1976) **8** 3M309 for part IV.] JVR

59

[Automated laboratory installation for study of lactic acid bacteria culturing in production of bacterial concentrates.]
Vainberg, I. A.; Brusilovskii, L. P.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Molochnoi Promyshlennosti No. 41, 49-57, 86 (1975) [14 ref. Ru] [VNIIMP, Moscow, USSR]

An automated laboratory installation intended to serve as model for development of equipment for automated production of concentrates of lactic acid bacteria in a whey or other medium is described in detail and diagrammatically illustrated. The installation consists of 3 culture vessels provided with mechanical variable speed stirrers, temp. and pH stabilization systems for culture medium, devices for purification of gases delivered to the culture vessels, and variable output metering devices for culture medium delivery. Tests showed satisfactory operation of the installation under conditions of batch or continuous culturing of lactic acid bacteria. SKK

60

[Effect of length of incubation on the accumulation of lactic streptococci and on their stability during storage.]
Belova, G. A.; Kornelyuk, A. N.; Klimova, L. I.
Molochnaya Promyshlennost' No. 8, 7-10 (1975) [4 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Strains of lactic streptococci (Str. lactis 542_{10}, 369_3 and 339_6, Str. cremoris $T18_{15}$, Str. diacetilactis 107_5 (high-acid producer) and 161_3 (low-acid producer) and Str. paracitrovorus 641_{22}) were grown in a whey medium at 30°C for 24 h; after 6 h incubation the cultures were neutralized to acidities close to the initial levels. Bacterial cells were separated from the medium by centrifuging at 20 000 rev/min at 4, 9, 12, 15 and 24 h incubation and suspended at 1:1 ratio in a solution containing 10% sucrose and 5% sodium citrate. The numbers of total bacteria and of aroma-producing bacteria, ratios of different types of bacteria, pH and titratable acidity, gas production, bacterial and mass yield, etc. were determined at each centrifugation. The highest bacterial mass yields were obtained at 9, 12 and 15 h of cultivation and the bacterial concentrate obtained as a suspension at the end of logarithmic and beginning of stationary growth phase (at 9 and 12 h) was the most stable during storage at +5 and -10°C. It is concluded that for cultures used to produce bacterial concentrates for small hard cheese the optimum incubation period is 9-12 h. FL

61

Uncoupling of growth and acid production in lactic streptococci.
Turner, K. W.; Thomas, T. D.
New Zealand Journal of Dairy Science and Technology **10** (4) 162-167 (1975) [18 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

During the exponential phase, growth of Streptococcus cremoris AM_2 in broth at 32°C was coupled to lactate production. Stresses, such as temp. at 40°C, high salt concn. (4.5%) and high H^+ concn. (pH 5.0) resulting in uncoupling, inhibited growth completely while lactate production continued; the specific rates of lactate production per unit mass of cells (RL) under the conditions of stress listed were 64%, 10% and 23% respectively of the value with cells growing exponentially. The RL value for Str. cremoris AM_2 starved in the presence of lactose was 41% of the value with growing cells. Of 8 Str. cremoris strains tested in milk at 32°C, 5 grew at the same rate for the complete growth cycle, but 3 strains partially uncoupled since the growth rate decreased markedly at about 25% of the max. cell density while the rate of lactate production was less affected. Complete uncoupling of growth and acid production with Str.cremoris AM_2 in milk was found with salt concn. >3% and at elevated temp. (38-40°C) similar to those applied during "cooking" in Cheddar cheese manufacture. Whereas in broth, growth was inhibited at pH 5, growth in milk continued at higher acidities. LMB

62

[Required standard for raw milk - absence of Group B streptococci.] Anforderungen an die Beschaffenheit von Rohmilch - Freisein von B-Streptokokken.
Wiesner, H.-U.; Hübler, C.
Deutsche Tierärztliche Wochenschrift **82** (1) 17-22 (1975) [25 ref. De, en] [Bischofsholer Damm 15, Hanover 3, Federal Republic of Germany]

Regular bacteriological control, of both individual cows' and bulk milk samples, involving both cell count and incidence of Streptococcus agalactiae in a herd of 100 German Black Pied cows over a period of 2 yr, revealed an average cell count of 250 000/ml and the presence of Str. agalactiae in a relatively high proportion of samples. Permanent carriers of Str. agalactiae were detected, after enrichment of quarter milk samples, from 7 clinically healthy cows. It is proposed that statutory requirements in the German Federal Republic should include the regular examination of cow milk samples for Str. agalactiae. EJM

63

[Temperature conditions in young Emmental cheese and their effects.] Über die Temperaturverhältnisse im jungen Emmentalerkäse und ihre Auswirkungen.
Gehriger, G.; Wüthrich, A.; Kaufmann, H.; Hofmann, J. M.
Deutsche Molkerei-Zeitung **96** (46) 1527-1528, 1531-1533, 1536-1537 (1975) [7 ref. De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld-Bern, Switzerland]

Temp. measurements were carried in 9 sites of young Emmental cheeses during cooling in the press; the observations covered numerous cheeses at different times of the yr in different Swiss cheese factories using steam boilers or electrically heated boilers. Effects of temp. conditions on lactic acid fermentation in the cheeses were studied by determining pH and contents of lactic acid, glucose and moisture. The results are presented in a series of 21 graphs and are discussed in detail. Heat loss of cheese depended primarily on press-room temp. (which varied largely under seasonal influence). At low temp., cooling was rapid and marked differences formed between the different cheese sites. Despite the high initial cheese temp. (50°C), good establishment of acidification was noted in the 1st 6 h. However, activity of lactic acid bacteria was inhibited if the high cheese temp. persisted or if the cheese cooled too rapidly. Excessive temp. differences in a cheese and extreme press-room temp. resulted in unsatisfactory drainage of whey and in cheese defects. SKK

64

[Use of polyphosphates in raw meat products: activity of microorganisms.]
Cattaneo, P.; Dragoni, I.; Cantoni, C.
Industrie Alimentari **14** (12) 85-88 (1975) [46 ref. It, en] [Istituto di Ispezione degli Alimenti di Origine Animale, Fac. di Med. Vet., Milan, Italy]

Micrococci and lactobacilli isolated from dry, ripened meat products were tested for pyrophosphatase activity by culture on a medium containing sodium pyrophosphate, and detn. of the orghophosphate liberated by the bacteria. All of the 5 strains each of micrococci and lactobacilli studied showed pyrophosphatase activity. The significance of this bacterial pyrophosphatase activity (and the polyphosphatase activity of myosin B) for the use of added phosphates in ripened meat products is discussed. AJDW

65

[Moto-mash making with addition of lactic acid bacteria. I. Selection of antibiotic-resistant mutants from lactic acid bacteria found in moto.]
Yanagisawa, Y.; Yoshida, H.; Fukui, S.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] **70** (6) 416-419 (1975) [5 ref. Ja] [Gunma State Ind. Exp. Sta., Maebashi, Gunma-ken, Japan]

Leuconostoc mesenteroides B-07 and Lactobacillus sake ATCC 15578 found in moto--mash, yeast starter of sake fermentation, were treated with N-methyl-N'-nitro-N-nitrosoguanidine. Resistant strains against streptomycin and penicillin were obtained. YN

66

[Moto-mash making with addition of lactic acid bacteria. II. Yamashi-moto incubation with antibiotic-resistant lactic acid bacteria.]
Yanagisawa, Y.; Yoshida, H.; Fukui, S.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] **70** (6) 420-423 (1975) [11 ref. Ja] [Gunma Ind. Exp. Sta., Maebashi, Gunma-ken, Japan]

Yamahai-moto, a yeast starter of sake fermentation, was incubated with addition of streptomycin-resistant Leuconostoc mesenteroides Y-32, and penicillin-resistant Lactobacillus sake Y-314, and their population change was followed during incubation. Leuc. mesenteroides Y-32 was the main lactic acid fermentor in the mash, and was capable of growth at 7°C, while L. sake Y-314 could grow only at >15°C. YN

67

[A new strain of lactic acid bacteria (Lactobacillus fermenti-27) for use in bread production.]
Vitavskaya, A. V.; Nafanailova, L. G.; Zainullina, G. Kh.; Kazanskaya, L. N.; Afanaseeva, O. V.; Vasil'eva, A. I.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 7, 18 (1975) [Ru] [Inst. "Kazgipropishcheprom", USSR]

The new strain, recommended for use in inhibiting rope formation in bread, was isolated from spontaneously fermenting wheat leaven of 25° acidity. Isolation of pure culture by means of 6-fold

purification is described. Identification was based on biochemical characteristics and physiological properties. Addition of 4-6% of leaven containing L. fermenti to dough resulted in more intense fermentation and inhibited the formation of rope. STI

68

Testing the lactic streptococci for agglutinin titre in cows milk.
Ellerman, J. A. G.
Australian Journal of Dairy Technology **30** (3) 111-113 (1975) [7 ref. En] [Dairy Farmers Co-operative Ltd., Sydney, NSW, Australia]

A method which allows the simultaneous observation of different agglutinin types in a mixture and the rapid testing of many cultures against a large number of milk samples is described. It is based on the Cooke Microtiter System [Conrath, (1972) Handbook of Microtiter Procedure]. Weekly tests were carried out on 11 strains of Streptococcus cremoris, 2 of Str. lactis and 3 mixed strains, from Jan.-July 1974, with bulk cows' milk from many region of New South Wales. Log mean agglutinin titre in raw milk was highest (26.4) with Str. cremoris C11 but pasteurization of the milk at 77°C for 15 s reduced the titre by ≥60% (to 4.0 in the case of Str. cremoris). A comparison with agglutinin titres obtained by Emmons et al. [Journal of Dairy Science (1966) **49** (11) 1357-1366] is made and some strains are seen to be more antigenically stable than others. LMB

69

[Variations in the content of acid-soluble nucleic acid derivatives (DNSA) as a function of lactic fermentation.]
Corradini, C.; Bottazzi, V.; Biasucci, B.
Annali della Facolta di Agraria, Universita Cattolica del Sacro Cuore, Milano **13** (1/3) 394-401 (1973, publ. 1975) [9 ref. It, fr, en]

A study was made of changes in DNSA content occurring in various types of milk (bulk milk from large groups of cows; bulk milk from small groups of cows; milk from individual cows; and UHT milk) during lactic fermentation. A direct ratio between the increase in total DNSA content and the increase in titratable acidity (°SH) was found in the bulk milks and UHT milk inoculated with a 1:1 mixture of Lactobacillus bulgaricus strain IOL 2 and Streptococcus thermophilus strain CHST 3, but not in inoculated milk from individual cows. The increase in DNSA content in inoculated UHT milk was less marked than in the inoculated bulk milks, where there was possibly synergism between the pre-existing and inoculated organisms. In non-inoculated raw bulk milk which was left to acidify at ambient temp., the changes in total DNSA content varied from sample to sample; there appeared to be decreases in DNSA content with increases in acidity between 5 and 15°SH/50 ml. ADL

70

Stabilized dry cultures of lactic acid-producing bacteria.
Porubcan, R. S.; Sellars, R. L. (Chr. Hansen's Laboratory Inc.)
United States Patent 3 897 307 (1975) [En]

Stabilized dried bacterial concentrates, particularly of Streptococcus thermophilus, Lactobacillus bulgaricus and L. acidophilus, are prepared by adding to the grown culture before drying, 2 'potentiators' (i) L-ascorbic acid and its water-soluble edible salts in amounts of ≤20 parts by wt./100 parts of dry solids in the growth medium, and (ii) the same amount of either glutamic acid or aspartic acid and their water-soluble edible salts (preferably the former as monosodium glutamate). When the organism is to be freeze-dried in its growth medium, the addition of a cryoprotectant such as sorbitol, glucose, sucrose, etc. is desirable. The invention is claimed to have particular application in home use preparations, such as dried yoghurt and/or acidophilus cultures in powder or tablet form. EJM

71

Preservation of mixed species lactic starter concentrates by freezing and lyophilization methods.
Pettersson, H.-E.
Milchwissenschaft **30** (9) 539-548 (1975) [40 ref. En, de] [Chem. Cent., Div. of Tech. Microbiol., Univ. of Lund, S-230 53 Alnarp, Sweden]

4 commercial BD-type mixed starters were grown in reconstituted 9.1% TS skim-milk, whey medium and tryptone medium [Lait (1968) **48** (471/472) 13-30]. 100% preservation of viability was maintained for >400 days by freezing and storing at -196°C in liquid N_2 (without cryoprotective agents), and for 100 days by freezing and storing in methanol at -30°C. Cells frozen slowly at -25°C in still air gradually lost viability during storage and only about 50% viability remained after 2 months; with freezing in liquid N_2 and subsequent storage at -25°C there was no significant loss of viability after 3 months, whereas storage at 5°C resulted in 50% loss of viability after 19 days. Bacterial balance, lactic acid-producing activity, proteolytic activity, aroma formation and CO_2 production remained almost constant throughout storage at -196°C. Cryoprotective agents improved results at the higher storage temp. Low pH (<6) in the freezing medium lowered stability under all freezing and storage conditions examined. The extra stress factor involved in freeze-drying caused losses in viability and lactic acid-producing activity, but these were minimized by use of 7% lactose as protective agent and storage in evacuated ampoules at +5°C. Cheeses made by direct inoculation of frozen concentrated starter after storage at -196°C for 4 months were comparable to those made with traditional bulk starter but had lower values for soluble N. CDP

72

[Study of phage-typing of strains of lactic acid bacteria intended for the dairy industry.]
Bozio, J.-Y.; Leclerc, M.-C.; Guy, P.
Revue Laitiere Francaise No. 334, 561, 563-564 (1975) [14 ref. Fr] [Lab. de Microbiol, 4 Rue Ledru, 63000 Clermont-Ferrand, France]

63 strains of Streptococcus cremoris, Str. lactis and Str. diacetilactis were typed using 44 phages. In general, the phages of each species were virulent only in that species. However, 3 strains of Str. cremoris were lysed equally by Str. cremoris and Str. lactis phages, and 1 strain of Str. diacetilactis was lysed equally by Str. lactis and Str. diacetilactis phages. 15 Str. cremoris, 5 Str. lactis and 3 Str. diacetilactis strains were each lysed by only 1 phage, whilst 8 Str. cremoris and 5 Str. lactis strains were each lysed by only 2 phages; 1 Str. cremoris strain was lysed by 14 phages, and the remaining strains by 3-8 phages each. 31 strains had no common phage. These results confirmed the possibility of produging mixed cultures of phage-unrelated strains, thereby reducing the risk of starter failure due to phage activity. CDP

73

[Method for production of a protein-rich cultured milk product.]
Silant'eva, L. A.; Krasnikova, L. V.; Vasil'ev, N. F.; Novotel'nov, N. V. (**Union of Soviet Socialist Republics**, Leningradskii Tekhnologicheskii Institut Kholodil'noi Promyshlennosti)
USSR Patent 493 219 (1975) [Ru]

A product with a TS content of 16-21% and improved flavour and nutritive value is obtained by 2-stage souring of milk, first at 22-23°C with the aroma-forming Streptococcus diacetilactis, and then at 29-31°C with a mixture of Str. diacetilactis, Str. cremoris and Str. lactis. W&Co

74

[Production of D- and L-lactate in yoghurt, cultured milk and kefir.] Zum Vorkommen von D(-)- und L(+)-Laktat in Joghurt sowie Sauermilch und Kefir. [Thesis]
Benner, J.
68pp. (1975) [82 ref. De, en] Tierärzliche Hochschule Hanover, Federal Republic of Germany

40 cultured milk, 71 natural yoghurt, 172 fruit yoghurt, 8 bioghurt and 8 kefir samples from 13 areas throughout the German Federal Republic were tested enzymically for lactic acid by continuous-flow analysis. Average lactic acid content was 1%. The proportion of lactate that was in the D(-) form was 6.6% for cultured milk, 41.2-42.7% for yoghurt and 24.9% for bioghurt; none was found in kefir, and only 3 of the cultured milk samples showed more than a min. amount. In all yoghurt cultures, formation of L(+)-lactate ceased after 3-5 h when pH had reached 4.6-4.3 and about 900 mg total lactate/100 ml had been formed; formation of D(-)-lactate then increased and pH 3.7-3.8 was attained. During milk acidification, Streptococcus thermophilus produced only L(+)-lactate and Lactobacillus bulgaricus only D(-)-lactate; L. acidophilus and L. bifidus produced both isomers, but predominantly L(+)-lactate. CDP

75

Lipolysis by lactic acid bacteria recognized through color changes of dye-stained butterfats on double-layered agar plates.
Umemoto, Y.; Sato, Y.
Milchwissenschaft **30** (10) 591-594 (1975) [12 ref. En, de] [Dep. of Food Sci. & Tech., Fac. of Agric., Nagoya Univ., Nagoya, Japan]

The effect of growth conditions before plating upon the extent of lipolysis by Streptococcus thermophilus 510, Str. lactis 527 and Lactobacillus casei L7 was investigated using double-layered agar plates containing Victoria blue- and Nile blue-stained butterfats. The 3 organisms took only 1 or 2 days to produce a clear colour change of Victoria blue-stained butterfat irrespective of the growth phase they were in when plated; however, times taken for lag, logarithmic, and stationary growth phase cultures respectively to change the colour of Nile blue-stained butterfat were 3, 2 and 4 days for Str. thermophilus, 5, 4 and 5 days for Str. lactis, and 7, 5 and 6 days for L. casei. Glucose appeared to be essential for rapid lipolysis of the 3 oeganisms. CDP

76

[Comparative qualitative analysis of the microflora in Saint-Nectaire cheese made in dairies and on farms.]
Vidal, J.
Revue Laitiere Francaise No. 335, 649, 651 (1975) [3 ref. Fr, en] [Lab. de Microbiol., Univ. de Clermont-Ferrand, Clermont-Ferrand, France]

Of 32 strains of lactobacilli isolated from factory-made cheeses and 117 from farm-made cheeses, 133 were homofermentative, 90 being classified as streptobacteria (predominantly Lactobacillus casei) and 43 as thermobacteria (L. jugurti and L. helveticus); 16 heterofermentative betabacteria (L. buchneri, L. brevis and L. fermenti) were found. Betabacteria predominated in factory-made cheeses and thermobacteria in farm-made cheeses. No L. plantarum was found. Enterococci isolated from farm-made cheeses were predominantly Streptococcus faecalis, whereas factory-made cheeses contained Str. faecalis and Str. faecium in equal proportions. Farm-made cheeses were rich in Staphylococcus aureus and Staph. epidermidis, but factory-made cheeses contained micrococci fo Baird-Parker subgroups 1, 7 and 8 only. [See also preceding abstr.] CDP

77

The utilization of citrate by lactic acid bacteria in milk and cheese.
Cogan, T. M.
Dairy Industries International **41** (1) 12-16 (1976) [28 ref. En] [Nat. Dairy Res. Cent., Moorepark, Fermoy, Co. Cork, Irish Republic]

Recent studies on citrate utilization, and diacetyl and acetoin production by lactobacilli and pure and mixed starter cultures are reviewed under the headings; detection of aroma producers; biosynthesis; necessity for citrate; utilization of citrate in milk; effect of Mn^{2+}; and citrate utilization in cheese. Areas in which further research is required are suggested. CDP

78

Autolytic properties of some lactic acid bacteria used in cheese production. I. Material and methods.
Bie, R.; Sjostrom, G.
Milchwissenschaft **30** (11) 653-657 (1975) [15 ref. En, de] [Div. of Tech. Microbiol., Lund Univ., Alnarp, Sweden]

The method selected was based on the detn. of leakage of DNA from cells during autolysis. Since DNA liberated during autolysis was rapidly broken down, total DNA was determined initially and at intervals during the experiment, and decrease in cell-bound DNA taken as a measure of autolysis. DNA was determined colorimetrically with a diphenylamine reagent after hydrolysis at 70°C [Biochemical Journal (1956) **62**, 315]. Procedures for determining DNA fractions in bacterial suspensions and in cheese, and corrections which have to be applied, are described. Semi-micro Kjeldahl methods for detn. of proteolysis in casein solutions and cheese are also described. CDP

79

Degradation of milk proteins by enzymes from lactic acid bacteria used in cheese making. A review.
Castberg, H. B.; Morris, H. A.
Milchwissenschaft **31** (2) 85-90 (1976) [112 ref. En, de] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St Paul, Minnesota 55108, USA]

The authors review the subject under the headings of proteolysis of proteins in milk and cheese systems by added pure cultures, proteolytic activity of cell-free growth media and washed cells and cell fractions, and intracellular proteinases and peptidases. FL

80

Thermal resistance of some aciduric food spoilage organisms.
Splittstoesser, D. F.; Wilkison, M.; Lienk, L. L.
Abstracts of the Annual Meeting of the American Society for Microbiology **75**, 204 (1975) [En] [Cornell Univ., New York State Agric. Exp. Sta., Geneva, New York, USA]

The effect of the suspending medium on the heat resistance of yeasts and lactic acid bacteria capable of growing in wines and other acid foods was investigated. Of the variables studied (sugar and acid concn., pH, wine type, etc.), the level of ethanol had the greatest effect on heat resistance. A flor yeast, for example, gave D-values at 51°C of 0.30 min in Concord grape juice containing 12% ethanol, 2.0 min in 8% ethanol juice, and 16 min when ethanol was omitted. With the exception of one heterofermentative Lactobacillus, the lactics exhibited less heat resistance than the yeasts in wines. Leuconostoc oenos ML-34, a malo-lactic strain, is the most heat-sensitive organism studied to date: it gave an average D-value of 0.32 min at 45°C in wine containing 12.1% ethanol. AS

81

The toxicity of sulphur dioxide towards certain lactic acid bacteria from fermented apple juice.
Carr, J. G.; Davies, P. A.; Sparks, A. H.
Journal of Applied Bacteriology **40** (2) 201-212 (1976) [16 ref. En] [Long Ashton Res. Sta., Long Ashton, Bristol BS 18 9AF, UK]

This paper describes a method for testing the effect of various concn. of SO_2 on lactic acid bacteria from ciders. The media and methods were devised to minimize loss of SO_2 due to oxidation or binding with carbonyl compounds. Exposure of laboratory or freshly isolated strains to various concn. of free SO_2 at pH 4.0 did not readily kill them even at high concn. of free SO_2 (approx. 150 ppm or 0.97 ppm molecular SO_2) yet they were suppressed at low concn. (approx. 5 ppm or 0.032 ppm molecular SO_2). Reducing the pH to 3.4 reaffirmed how much more effective SO_2 is against lactic acid bacteria at lower pH levels because more is present as molecular SO_2. As a result of this the idea of quoting SO_2 values as ppm molecular SO_2 is advocated. Addition of H_2O_2 or acetaldehyde to a test system containing 142 ppm free SO_2 showed that they had a similar effect in nullifying its antimicrobial properties and allowing the test bacteria to grow. There was no indication that acetaldehyde bisulphite was toxic to the test bacteria. AS

82

Isolation of a Pediococcus with unusual antimicrobial properties.
Fleming, H. P.; Etchells, J. L.; Costilow, R. N.
Abstracts of the Annual Meeting of the American Society for Microbiology **75**, 199 (1975) [En] [N. Carolina State Univ., Raleigh, N. Carolina, USA]

P. cerevisiae has been reported to be inhibitory to Lactobacillus plantarum in mixed culture inoculation of brined cucumbers. This inhibitory property was associated with only one strain of Pediococcus isolated from fermenting cucumber brines. Cultures were screened for sensitivity to the Pediococcus, grown on trypticase soy agar, by a seeded agar overlay technique. Bacteria sensitive to the inhibitor included L. plantarum, Leuconostoc mesenteroides, 13 other strains of pediococci from

various sources, and several other species of Gram-positive bacteria. Of 5 spp. of Gram-negative bacteria and 4 spp. of yeasts tested, none was inhibited. The inhibitor has not been fully identified, but it is not H_2O_2. These findings demonstrate that care must be exercised in choosing strains of Pediococcus for mixed culture inoculations. On the other hand, as a starter culture, this strain may offer desirable inhibitory properties against some food spoilage bacteria. AS

83

[Growth promotion of Pediococcus halophilus by a basic substance in soybean miso.]
Takeuchi, T.
Journal of Fermentation Technology [Hakko Kogaku Zasshi] **53** (1) 1-5 (1975) [7 ref. Ja] [Food Res. Inst., Aichi Prefecture, Shinpukuji-cho, Nishi-ku, Nagoya, Japan]

2 growth promoting fractions for Pediococcus halophilus, (i) B-fraction and (ii) P-fraction studied by separation from defatted soybean flour, 3 kinds of koji, and soybean miso. (i) obtained from soybean miso stimulated the growth of P. halophilus more than betaine, and was composed of 2 growth promoting substances. The main growth promoting substance in (i) corresponded to betaine, the other was on unknown basic substance having a slight effect on growth. Growth promoting activity of betaine in the presence of (ii) was higher than of choline. (i) and (ii) were present in autoclaved soybean flour, 3 kinds of koji (rice, wheat bran, defatted soybean) obtained from pure culture with Aspergillus sojae, and in the hydrolysate of defatted soybean obtained by the protease preparation from Aspergillus oryzae. Growth promoting activity of these (ii) was markedly increased by the proteolysis of soybean by koji, and by protease preparation, and was higher than those of autoclaved soybean flour polypeptone. There were no differences in activity among (i). It is possible to consider that (ii) strictly controlled the growth of P. halophilus in miso and soy sauce, and that the stimulative activity of (ii) resulted from the proteolytic characteristics of A. oryzae. HK

84

[Metachromatin granules of rod-shaped yoghurt lactic bacteria.]
Erzinkyan, L. A.; Akopova, A. B.
Biologicheskii Zhurnal Armenii **28** (5) 3-8 (1975) [8 ref. Ru, em] [Inst. Mikrobiol. AN ArmSSR, USSR]

Since presence or absence of metachromatin granules in cells of yoghurt lactic bacteria can be used as an indicator evidencing physiological state of the cells at optimum cultivation conditions, the appearance or absence of these metachromatin granules was followed in cells of rod-shaped yoghurt lactic bacteria in relation to variable cultivation conditions. The greatest number of well-stained and evenly distributed metachromatin granules was obtained after 24-48 h incubation at optimum temp. 36°C and in the presence of asporogenic yeasts. STI

85

Effect of pasteurization and hydrogen peroxide-catalase treatment of milk on lactic acid bacteria in Domiati cheese.
Shehata, A. E.; El-Sadek, G. M.; Khalafalla, S. M.; El-Magdoub, M. N. I.
Egyptian Journal of Dairy Science **3** (3) 139-144 (1975) [13 ref. En, ar] [Food Sci. Dep., Fac. of Agric., Ain Shams Univ., Shobra El-Khema, Cairo, Egypt]

The % lactic acid bacteria present in fresh Domiati cheese made from milk treated with 0.02% H_{O2} for 60 s at 125°F differed from the % in cheese made from milk pasteurized at 145°F for 30 min. The bacteria isolated from the 2 cheese types respectively were Streptococcus lactis (30.77 vs 28.57%), Str. cremoris (7.69 vs 0%), Str. thermophilus (15.38 vs 21.43%), Str. faecalis (46.13 vs. 50%), Lactobacillus plantarum (75 vs 50%), L. casei subsp. casei (8.33 vs 25%) and subsp. alactosus (8.33 vs 0%), and L. fermenti (8.33 vs 25%). Str. lactis disappeared from the cheese made from pasteurized milk after 30 days of ripening. The Lactobacillus spp. were found in both cheeses throughout the ripening period of 90 days, L. plantarum being the predominant sp. in both cheeses. LMB

86

Lactobacillus acidophilus. I. Growth characteristics and metabolic products. II. Antimicrobial agents.
Mikolajcik, E. M.; Hamdan, I. Y.
Cultured Dairy Products Journal **10** (1) 10, 12-14, 16; 18, 20 (1975) [47 ref. En] [Dep. of Food Sci. & Nutr., Ohio Agric. Res. & Development Cent., Columbus, Ohio 43210, USA]

Doubling times of 6 strains of L. acidophilus in reconstituted dried skim-milk (11% TS) at 98.6°F ranged from 49.1 to 103.9 min after 4 h and from 207.8 to 256.7 min after 24 h. Growth was most rapid at 98.6%F for strains ATCC 11506 and ATCC 5456, and 89.6°F for strain NCDO 3; all 3 strains grew very slowly at temp. <80.6°F. Length of initial incubation period did not greatly influence survival during subsequent storage at 41°F, there being little loss of viability during 14 days. L. acidophilus NCDO 3 first showed an antagonistic effect on Pseudomonas fluorescens and Escherichia coli after 24 h incubation when pH had fallen to 4.3; effect was max. after 48 h and at pH 4.15. The inhibitory agent appeared to be dialysable and of low mol. wt.; total inhibitory effect could not be related to lactic acid alone. A brief literature review of antibiotic substances associated with lactic acid bacteria is followed by a report on the isolation of an antimicrobial agent from L. acidophilus [Journal of Antibiotics (1974) **27** (8) 631]. The agent isolated from Hansen's strain 2181 was found to be the most active of 9 isolates tested against Staphylococcus aureus by means of the disc assay technique. CDP

87

[Proteolytic activity of lactic acid bacteria and bacterial starters for production of brine cheese.]
Charyan, L. M.; Pakhlevanyan, M. Sh.; Erzinkyan, L. A.; Vekilyan, S. M.
Biologicheskii Zhurnal Armenii **28** (1) 66-71 (1975) [15 ref. Ru, am] [Inst. Mikrobiol. ArmSSR, USSR]

The quality of bacterial cheese starters depends mainly on their proteolytic activity. Strains of Lactobacterium helveticum and Streptococcus lactis with the highest proteolytic activities were isolated from the best quality brine and hard cheeses and these were used as new highly active bacterial starters. STI

88

[Psychrotrophic lactic acid bacteria in pasteurized milk.]
Moiseeva, E. L.; Mishuchkova, L. A.; Shablii, O. M.
Molochnaya Promyshlennost' No. 1, 11-13 (1976) [4 ref. Ru] [Vses. Nauchno-issled. Inst. Kholodil'noi Promyshlennosti, USSR]

'Psychrotrophic lactic acid bacteria' were studied in milk samples collected immediately after pasteurization (from the pasteurizer) and after filling into bottles and Tetra Pak containers. The samples were stored at 4 different temp. in the 2-10°C range. Ten-fold increases in the numbers of these bacteria occurred after 10 h at 10°C, after 25 h at 8°C and after 48 h at 5°C; at 2°C bacterial growth was significantly reduced. 50 strains of psychrotrophic lactic acid bacteria were isolated from milk kept at 5°C and their cultural and biochemical properties determined. They were divided into 4 groups of which 3 groups were identified as Streptococcus lactis, Str. paracitrovorus and Str. mesenteroides respectively; the 4th group was not identified. It is considered that the capacity of these bacteria to grow at low temp. could be utilized in buttermaking (ripened-cream butter) and in cheesemaking. FL

89

Tyrosine and histidine decarboxylase activities of Pediococcus cerevisiae and Lactobacillus species and the production of tyramine in fermented sausages.
Rice, S. L.; Koehler, P. E.
Journal of Milk and Food Technology **39** (3) 166-169 (1976) [14 ref. En] [Dep. of Food Sci., Univ. of Georgia, Athens, Georgia 30602, USA]

In investigating formation of tyramine and histamine in a model system, it was found that 4 commercial sausage starter cultures did not exhibit appreciable tyrosine or histidine decarboxylase activity. In addition, other species of Pediococcus cerevisiae and Lactobacillus did not display appreciable decarboxylase activity. Mixtures of P. cerevisiae and L. plantarum were also unable to produce significant levels of these amines. One species of Streptococcus tested was able to produce 34.5 µg of tyramine/h under the assay conditions. When P. cerevisiae and L. plantarum were used as starter cultures to prepare sausages, it was found that this treatment resulted in lower tyramine levels (approx. 200 µg/g) than when the Streptococcus sp. was used as a starter culture (approx. 300 µg/g). However, the use of P. cerevisiae and L. plantarum did not result in a significantly lower tyramine level than when no starter culture was used. AS

90

Bacillus subtilus modification of combined food wastes and subsequent Lactobacillus acidophilus growth for the production of protein.
Schmidt, B. E.; Busta, F. F.; McKay, L. L.
Abstracts of the Annual Meeting of the American Society for Microbiology **75**, 196 (1975) [En] [Univ. of Minnesota, St. Paul, Minnesota, USA]

A process is proposed for the simultaneous utilization of food wastes and production of single cell protein by the successive growth of B. subtilis and L. acidophilus in a medium composed of collagen and starch, and fortified with cheese whey. Both B. subtilis and L. acidophilus growth were favoured by high collagen and high starch concn. L. acidophilus growth was also favoured by a short growth period of B. subtilis and fortification with a small amount of cheese whey. Addition of yeast autolysate was inhibitory. Starch degradation was enhanced by a high collagen concn. and a long growth time of B. subtilis. Complete degradation of added starch was obtained. B. subtilis grew to a max. optical density (OD) of 2.7 in <16 h and L. acidophilus gave an OD of 0.90 in 12 h. These laboratory results suggest the feasibility of the proposed process, however, they have not been verified with the use of actual food wastes in a non-laboratory situation. AS

91

[Studies on Takjoo brewing conditions with commercial enzymes. II. Quality examination of Takjoo.]
Kang, H. W.; Kwon, T. J.; Lee, I. K.
Korean Journal of Applied Microbiology and Bioengineering **3** (1) 41-48 (1975) [3 ref. Ko, en] [Dep. of Microbiol. Eng., Kon-kuk Univ., Seoul, Korea]

Chemical composition and quality of Takjoo mash brewed with commercial amylase, Lactobacillus bulgaricus and yeast were examined. A mash brewed from wheat flour, corn flour, rice and pressed barley produced 917-1350 mg lactic acid and 6-32 mg succinic acid/100 ml. A mash from pressed barley produced 6.5 mg citric acid and those from wheat flour and corn flour produced, respectively, 1.7 mg and 1.4 mg malic acid/100 ml. 17 amino acids were found at the level of 31 mg/100 ml, of which glycine and alanine (important as flavour components of Takjoo) comprised 0.6 and 4.3 mg, respectively. KoSFoST

92

Influence of nisine on productivity of the nisine-producing strain Streptococcus lactis V-20.
Oberman, H.; Pabis, E.
Acta Alimentaria Polonica **1** (3/4) 221-234 (1975) [12 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiol., Politech., Lodz, Poland]

Initial concn. of 50-1000 RU nisin/ml in the culture medium (sterilized milk or 1/15M phosphate buffer) had little influence on the amount of nisin produced by Str. lactis V-20, although rate of nisin production was greatest when cells, isolated during or at the end of the log phase of growth, were inoculated into culture medium with an initial nisin level of ≤200 RU nisin/ml. In many cases, rate of nisin production was irregular, possibly due to unidentified physico-chemical factors or to utilization of nisin by the producing strain. Acidifying ability of Str. lactis appeared to be independent of nisin-producing activity, and was highest when the inoculum consisted of cells from the beginning of the log phase. When repeatedly inoculated into nisin-free milk, strains which had been grown in media containing 50-200 RU nisin/ml did not lose their nisin-producing activity as quickly as those which had been grown in media containing 500 or 1000 RU nisin/ml. CDP

93

Influences of temperature on growth of Streptococcus cremoris and Streptococcus lactis.
Lee, D. A.; Collins, E. B.
Journal of Dairy Science **59** (3) 405-409 (1976) [22 ref. En] [Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Optimal growth temp. in yeast extract broth for 9 strains of Str. cremoris, selected as representative of 45 strains, varied from 28° to 31°C (average 29.3°C). Max. growth temp. were 34.4° to 38.9°C in broth and in litmus milk (average 36.1°C). The 1 strain of Str. lactis had an optimal growth temp. of 31.5°C and a max. of 42°C. Max. growth temp. for the 9 strains of Str. cremoris were 3.9-10.4°C above the optimal temp., and strains with high optimal temp. did not necessarily have correspondingly high min. or max. temp. Only 3 strains with low max. growth temp. apparently were damaged by treatment for 90 min at 38.9°C. AS

94

[Effect of UV irradiation on Lactobacillus bulgaricus.]
Krsev, L.
Mljekarstvo **25** (10) 238-241 (1975) [5 ref. Sh] [Zagrebacka Mljekara, Zagreb, Yugoslavia]

A strain of yoghurt starter L. bulgaricus described as viscosus was irradiated anaerobically on MRS medium with different doses of UV radiation (800-2000 erg/mm^2) and 120 mutant strains were isolated. % of those with valuable characteristics (antibiotic resistance, rapid coagulation, aroma formation) are stated, and more detailed information is presented on 5 of them. SKK

95

Whey utilisation in food and drink. [Review]
Lang, F.; Lang, A.
Food Manufacture **51** (5) 63-64 (1976) [23 ref. En] [Commonwealth Bureau of Dairy Sci. & Tech., Lane End House, Shinfield, Reading, UK]

96

Effect of nisin-producing strains on the activity of some common starter cultures.
Kalra, M. S.; Dudani, A. T.
Indian Journal of Dairy Science **28** (4) 302-303 (1975) [8 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

3 nisin-producing strains, (i) Streptococcus lactis-4, (ii) Str. lactis-6, and (iii) Str. lactis-496 were inoculated individually into skim-milk to which 1 of 9 starter cultures had been added and incubated for 8 h at 30°C. With (iii) only starter cultures Str. lactis C_{10} and Str. diacetilactis DRC_1 were inhibited; all other starter culture strains gave a favourable response. With (i) however, only 3 Str. lactis strains and with (ii) only 2 Str. lactis, 1 Str. cremoris and 1 Str. diacetilactis strain compared favourably with controls. LMB

97

[Selection of lactic cultures and standardization of starter preparation under production conditions.]
Yakovlev, D. A.; Ibragimova, A. Z.; Avdonina, K. P.; Shamyaeva, N. D.; Ilyushina, K. I.
Maslozhirovaya Promyshlennost' **41** (11) 20-25 (1975) [7 ref. Ru] [VNIIZH, USSR]

Data are given for the selection of lactic starters used in margarine production. The starters are prepared with a view to their organoleptic evaluation, phage resistance, and aroma and acid producing activity, the ratio between diacetyl and acetaldehyde being in the range 2:1 to 5:1. Such starters have a strong milk taste and aroma, and have a stable operation quality if they multiply on sterile milk, if the equipment is well cleaned and if the milk is pasteurized at 120°C. STI

98

[Production and preservation of lactic acid bacteria biomass.]
Rymashevski, E. [Rymaszewski, J.]; Kornatski[Kornacki], K.; Ozimek, G.
Molochnaya Promyshlennost' No. 2, 43-46 (1976) [Ru] [Inst. Inzinierii i Biotech. Zwynosci, Akad. Rolniczo-Tech., Olsztyn, Poland]

Data on methods for obtaining and preserving cultures of 10 different strains of lactic acid bacteria (Streptococcus lactis, Str. diacetilactis, Str. cremoris and Lactobacillus casei) are given. Wheys partly hydrolysed with pepsin or papain and enriched with glucose, aqueous maize extract and Mg, Mn and Zn were used as the media. The cultures were freeze- or spray-dried with the addition of 10% dried skim-milk or 5% sodium proteinate, as a protective substance. The bacterial survival was better for

cultures with added dried skim-milk when the preservation was by spray-drying whilst sodium proteinate was more effective when freeze-drying was used. FL

99

Cultivation of mixed populations of streptococci and lactobacilli in cheese starter.
Libudzisz, Z.
Acta Alimentaria Polonica **1** (3/4) 247-257 (1975) [22 ref. En, pl] [Inst. Tech. Fermentacji Mikrobiol., Politech., Lodz, Poland]

Growth and proteolytic activity were observed in single- and mixed-strain cultures of Streptococcus lactis 112, Str. diacetilactis 239 and Lactobacillus casei WP-1 in modified Elliker's medium. In mixed cultures there was a clear stimulation of growth of lactobacilli and possibly a slight inhibition of growth of streptococci. Max. increase in biomass (39% greater than in single-strain cultures) was found in 24-h cultures containing equal quantities of streptococci and lactobacilli; these were attained by using inocula of 1:5 Str. diacetilactis L. casei and 1:10 Str. lactis L. casei. Proteolytic activity towards whole-, and α_s-casein was 5-8× higher in mixed cultures than in cultures of L. casei alone, but there was no pronounced effect on hydrolysis of β- or κ-casein. Results of studies on compounds responsible for stimulation of lactobacilli are to be reported later. [See also Acta Microbiologica Polonica, B (1973) **5**, 151.]. CDP

100

[Irradiation of meat. II. Effects on vitamin B_{12} and lactobacilli.] [Lecture]
Moreau, J. R.; Simard, C.; Lachance, R. A.
Proceedings of the European Meeting of Meat Research Workers **19** (Part II) 995-1013 (1973) [16 ref. Fr, en, de, ru] [Dep. des Vivres, Univ. Laval, Quebec, Canada G1K 7P4]

Studies on destruction of vitamin B_{12} and Lactobacillus viridescens ATCC 12706 in plastics film-wrapped ground beef and vacuum-packaged smoked sausages during γ-irradiation at ≤4.0 Mrad are described. Tables and graphs of results are given. Irradiation had little effect on vitamin B_{12} activity in the sausages; irradiation at 384 krad eliminated L. viridescens from vacuum-packaged smoked sausages. [See FSTA (1976) **8** 9S1589.] AJDW

101

A potential microbiological assay of fruit content in orange juice products.
Vandercook, C. E.; Smolensky, D. C.; Nakamura, L. K.; Price, R. L.
Journal of Food Science **41** (3) 709-710 (1976) [8 ref. En] [USDA, Fruit & Vegetable Chem. Lab., 263 S. Chester Ave., Pasadena, California 91106, USA]

A bacterium was found which under standard assay conditions grew in proportion to the amount of orange juice in a product. Imitation orange beverages did not support growth. Commercial concentrates from various sources were assayed by the microbiological procedure, and the variability of the results was about the same as or slightly lower than that of many of the other constituents used to estimate juice content. Preliminary tests suggest that the organism is a homofermentative Lactobacillus of the subgenus Streptobacterium. IFT

102

[Some properties of bacteriophages isolated during manufacture of Brynza cheese.]
Tsaneva, K. P.
Mikrobiologiya **44** (4) 736-741 (1975) [8 ref. Ru, en] [Tsentral'naya Eksperimental'naya Proizvodstvennaya Lab. Chistykh Kul'tur DSO Molochnoi Promyshlennosti, Sofia, Bulgaria]

The properties were studied of bacteriophages lysing cultures of Streptococcus lactis used for manufacture of Bulgarian Brynza cheese. 75 isolated bacteriophages were divided into 8 groups according to their lytic action towards 253 Str. lactic strains or into 3 groups according to their morphology and antigenic properties. This work is of interest in selection of bacterial strains for production of Brynza cheese. STI

103

Cytochemical observations on the extracellular carbohydrate produced by Streptococcus cremoris.
Brooker, B. E.
Journal of Dairy Research **43** (2) 283-290 (1976) [27 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Electron microscopy showed that a varying proportion of cells of Str. cremoris NCDO 924 grown in autoclaved skim-milk possessed a layer of extracellular material attached to the cell wall. Occasional filamentous extensions of this layer made contact with neighbouring casein micelles. The same surface-staining material persisted during the production of cheese-curd, but after max. scald it was predominantly filamentous in appearance. These filaments made frequent contact with the adjacent curd matrix and with milk-fat globules. Str. cremoris NCDO 1986 produced similar surface material when in curd, but not when grown in skim-milk. In all situations, the extracellular material stained with colloidal iron hydroxide, ruthenium red and periodic acid/thiosemicarbazide/silver proteinate, indicating that it was largely composed of an acidic carbohydrate. It is suggested that this carbohydrate facilitates the adhesion of starter bacteria to the cheese-curd matrix and that during the initial stages of syneresis this serves to prevent their expulsion from the curd with the whey. AS

104

[Effect of lactose content on the growth of mesophilic lactic streptococci.]
Priidak, T. A.
Molochnaya Promyshlennost' No. 3, 13-15 (1976) [7 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Cultures of Streptococcus lactis 203 and 25, and Str. acetoinicus 121 and 419 were grown at 25°C in

a medium consisting of tvorog whey with the addition of 10% hydrolysed milk, 3% sodium citrate and 164 mg $MnSO_4$/l.; the lactose content was varied between 0.5 and 4%. High concn. of lactose (3-4%) in the medium reduced the growth of all the cultures tested. Max. development of Str. lactis strains was at 0.5-1% lactose concn., whilst 1-2% concn. was optimal for Str. acetoinicus strains. Reduced lactose contents were obtained by appropriate dilution of the whey with water. FL

105

[Effect of protein content increase in a smetana-type product on lactic acid fermentation.] (In 'Ratsional'noe ispol'zovanie vtorichnogo molochnogo syr'ya'.) [Book]
Mochalova, K. V.
pp. 79-84 (1975) [4 ref. Ru] Minsk, USSR; Izdatel'stvo Nauka i Tekhnika [Belorusskii Filial Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Minsk, USSR]

A mixture of cream and skim-milk was passed through a colloidal mill, insoluble coprecipitate (obtained by heat and Ca salt treatment of milk) was added to give final products with 20% fat and (i) 4.0, (ii) 5.0, or (iii) 5.8% protein, and the mixture was heated to 85-90°C, homogenized at 100 atm pressure, and cooled to 25°C. 5% Kaunas smetana starter was added to (i)-(iii) synthetic creams and 20% natural cream (protein content, 2.5%), the products were incubated at 25°C for 8 h, cooled to 6-8°C and ripened at this temp. for 16 h. Contents of total lactic acid bacteria and aroma-forming bacteria, titratable acidity, and pH were determined initially and after incubation for 2, 4, 6, and 8 h and after ripening. Final values for control and final ranges for (i)-(iii) were: total lactic acid bacteria, 218 and 248-324 million/ml; aroma-forming bacteria, 43 and 44.5-101 million/ml; titratable acidity, 75° and 108-113°T; and pH, 4.62 and 4.79-4.96. It is concluded that addition of coprecipitate intensifies fermentation processes in smetana production. ADL

106

[Therapeutic and nutritional role of lactobacilli. International seminar held in Rome, 8, 9, 10 May, 1974.] Seminario Internazionale. Il ruolo terapeutico e nutrizionale dei laktobacilli. Roma 8-9-10 Maggio 1974. [Conference proceedings]
Italy, Istituto Superiore di Sanita; **Italy**, Istituto di Fisiologia Umana dell'Universita di Roma; **Italy**, Fondazione Giovanni Lorenzini
68pp. (1974) [It, en] Rome, Italy; Istituto Superiore di Sanita

Papers presented at this seminar included: Role and importance of the Lactobacillaceae, by R. Negri, L. von Lorch & G. De Felip (pp. 7-9, It, en); Recent aspects of taxonomy of the Lactobacilli, by M. E. Sharpe (pp. 10-15, En, it, 29 ref.); Recent aspects of taxonomy and ecology of lactic cocci (Abstract), by G. Ottogalli (p. 15, It); DNA-DNA homology in Lactobacillus and Pediococcus (Abstract), by F. Dellaglio, V. Bottazzi & M. Vescovo (p. 16, It); Bifidus bacteria: taxonomy (Abstract), by V. Scardovi (p. 16, It); Importance of live bacterial flora in cultured milks, by J. Pien (pp. 19-21, It, fr); Distribution and importance of enterococci and pediococci in cheese (Abstract), by B. Battistotti & V. Bottazzi (p. 22, It); Use of selected Lactobacilli strains for ripened-cream butter production (Abstract), by P. Renko (p. 22, It); Yoghurt in nutrition (Abstract), by A. Cantone (p. 23, It); The role of lactic starters (lactic acid bacteria) in cheese (Abstract), by P. Ritter (pp. 23-24, Fr, It); Microbiological aspects of the lactic flora of preserved vegetables (Abstract), by B. Bianchi Salvadori (p. 24, It); Lactobacilli in meat products (Abstract), by C. Cantoni (p. 25, It); Lactic cultures in normalization of the intestinal flora of young animals, by L. Premi (pp. 34-37, It, en, 19 ref.); Passage of lactic flora through the gastrointestinal system, by P. Salvadori (pp. 38-42, It, en, 5 ref.); Biophysico-chemical aspects of lactic fermentation: prospects in paediatrics, by F. Brughera (pp. 59-62, It, en, many ref.); and Intestinal anaerobic flora in infants treated with lyophilized lactobacilli, by U. Bonomi & S. Cavalieri (pp. 63-65, It, en, 6 ref.). ADL

107

[Species composition of lactic acid bacteria taking part in preparation and ripening of 'Vitosha' Kachkaval cheese.]
Petrova, N.
Khranitelna Promishlenost **24** (1) 14-16 (1976) [26 ref. Bg]

439 strains of lactic acid bacteria were isolated from raw cows' milk, cheddared curd, scalded curd and 'Vitosha' (cows' milk) Kachkaval cheese aged 5, 10, 20, 30, 45, 60, 90 and 120 days, the relevant samples being obtained during 1972-1973 from 2 cheese factories in Sofia. The strains were classified by the methods of Rogosa ° Sharpe [Journal of Applied Bacteriology (1960) **22** (3) 329] and Rogosa [International Journal of Systematic Bacteriology (1970) **20** (4) 519]. 91.3% of the strains were homofermentative and 8.7% were heterofermentative. 89.5% of homofermentative strains belonged to the Streptobacteria (58.3% Lactobacillus casein subsp. casei, 1.6% L. casei subsp. rhamnosus, 0.9% L. casei subsp. alactosus, and 28.7% L. plantarum); 1.1% belonged to the Thermobacteria (L. acidophilus 0.9% and L. jugurti 0.2%). The heterofermentative strains consisted of 6.9% Betabacteria (L. fermenti 5.6%, L. brevis 1.1%, and L. buchneri 0.2%); and 2.5% were not identified. L. plantarum alone or with equal proportions of L. casei predominated during the 20-45 day stage of Kachkaval cheese ripening, whereas L. casei predominated at the other stages and in the other products. SKK

108

Influence of Lactobacillus bulgaricus on microbiology and chemistry of Swiss cheese.
Biede, S. L.; Reinbold, G. W.; Hammond, E. G.
Journal of Dairy Science **59** (5) 854-858 (1976) [26 ref. En] [Dep. of Food Tech., Iowa State

Univ., Ames, Iowa 50011, USA]

Rindless block Swiss cheese was manufactured with different amounts of L. bulgaricus, 0.5-1000 ml/200 kg milk. The resulting cheeses were analysed microbiologically before brining and when removed from the 'warm room'. Analysis of selected flavour compounds was at 60 days. Small amounts of L. bulgaricus starter increased the numbers of streptococci and lactobacilli while large amounts decreased the number of streptococci. Increasing the amount of L. bulgaricus starter decreased the number of propionibacteria but increased free proline. Diacetyl and proteolysis increased with the amount of L. bulgaricus until large amounts of inoculum were reached whereupon they decreased. Increases in L. bulgaricus had little influence upon the concn. of free volatile fatty acids. AS

109

[Effects of various strains of microorganisms on biochemical and organoleptic properties of canned Vetchina ham manufactured according to an accelerated technology.] [Lecture]
Gorbatov, V. M.; Mikhailova, A. E.; Marushkina, V. I.; Mikhailova, M. M.; Ludanova, N. V.
Proceedings of the European Meeting of Meat Research Workers No. 20, 108-110 (1975) [4 ref. Ru, en, de, fr] [Vses. Nauchno-issled. Inst. Myasnoi Promyshlennosti, USSR]

Effects of various strains of lactic and denitrifying bacteria (mainly isolated from curing brines) on the quality of canned Vetchina ham were studied. Tables of results are given for the colour, aroma, consistency, taste, overall organoleptic score and volatile fatty acid, lactic acid, free amino acid and carbonyl compound contents of the ham. The results show that use of selected starter strains increases the concn. of flavour compounds and significantly improves the organoleptic properties of Vetchina ham. [See FSTA (1976) **8** 10S1831.] AJDW

110

The detection and identification of Pediococcus and Micrococcus in breweries, using a serological method.
Dolezil, L.; Kirsop, B. H.
Journal of the Institute of Brewing **82** (2) 93-95 (1976) [6 ref. En] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

A commercially-available antiserum for the identification of group D strains of Streptococcus contains antibodies which react with Pediococcus and Micrococcus, and provides a convenient method to detect these genera in yeast, wort and beer. After suitable adsorption it can be used to distinguish between Pediococcus and Micrococcus and, within each genus, to differentiate between groups normally found in a brewery environment and those from other sources. AS

111

Studies on fermented soymilk products. II. Effect of soymilk processing factors on the acid production by lactic acid bacteria in soymilk.
Kothari, S. L.
Indian Journal Microbiology **13** (2) 109-117 (1973) [15 ref. En] [Dep. of Food Sci. & Tech., G. B. Pant Univ. of Agric. & Tech., Pantnagar, Uttar Pradesh, India]

A study was made of the effect of soaking time of soybeans (0-168 h), method of conditioning of soybeans (unconditioned, cooked in boiling water for 20 min, or cooked in boiling water containing 0.3% $NaHCO_3$ for 20 min), grinding time (3-9 min), and soybean var. (Bragg, Clark-65, Hardey, Hood, Lee, Pb-I, S-13) on acid production by 4 single-strain cheese starters (Streptococcus lactis, Str. cremoris, Str. diacetilactis, lactic fermentor) and 2 yoghurt cultures (Str. thermophilus and Lactobacillus bulgaricus). Str. cremoris, lactic fermentor, Str. diacetilactis and L. bulgaricus produced most acid in soymilk from var. Bragg; Str. lactis produced most acid in var. Hood soymilk and Str. thermophilus in var. Pb-I soymilk. Optimum acid production was achieved with soaking times of 6-12 h and a grinding time of 7 min. More acid was produced by soymilk from unconditioned (raw) beans than from cooked beans. Addition of 1% lactose to soymilk enhanced acid production, particularly by the cheese starters. JA

112

Commensalism and competition in mixed cultures of Lactobacillus bulgaricus and Streptococcus thermophilus.
Moon, N. J.; Reinbold, G. W.
Journal of Milk and Food Technology **39** (5) 337-341 (1976) [16 ref. En] [Dep. of Food Tech., Iowa State Univ., Ames, Iowa 50011, USA]

113

[The food value of yoghurt.]
Novazzi, F.
Mondo del Latte **30** (1) 13-16 (1976) [15 ref. It]

After a brief discussion of the physiological effects of lactic cultures on the digestive tract, the author deals at length with the chemical composition of different types of yoghurt produced in Italy and elsewhere. He concludes by stressing certain points of major importance in yoghurt manufacture (specialized personnel, high-quality milk, continuous testing of starters, use of easily sterilizable equipment and containers, etc.). ADL

114

[Study of nisin-resistant strains of Streptococcus lactis and Propionibacterium shermanii.]
Lipinska, E.
Roczniki Instytutu Przemyslu Mleczarskiego **17** (2) 15-38 (1975) [Pl, ru, en] [IPM, Warsaw, Poland]

To assess their relative values in cheesemaking and their contributions to cheese-ripening

processes, the diagnostic characteristics were studied of the nisin-resistant (P) and normal (K) strains of both Str. lactis $2a_3$ and P. shermanii 1296; the intensities of lactic acid fermentation of the 2 Str. lactis strains and of propionic acid fermentation of the 2 P. shermanii strains in media with or without nisin were determined. In general, the P strain of Str. lactis showed a greater activity of the enzyme systems producing acetoin, diacetyl and CO_2, but was more sensitive to increased temp. and salt concn. than the K strain. Apart from producing more acetoin, the P strain of P. shermanii did not show marked differences from the K strain. The experimental procedure and the bibliography of 145 references are included in the printed full version of the paper, obtainable from the Dairy Industry Research Institute's library in Warsaw. SKK

115

[Seasonal variations in the biological properties of milk.]
Avakova, I. A.
Doklady TSKhA [Sel'skokhozyaistvennaya Akademiya imeni K. A. Timiryazeva] No. 191, 47-51 (1973) [11 ref. Ru]

Milk samples collected monthly from (i) a research farm with Kholmogor cows and (ii) the milk intake of a dairy combine were pasteurized, inoculated with Streptococcus diacetilactis strain 3 (5% of milk sample) and thermostated at 30°C. Titratable acidity, fat content, density and total bacterial counts were determined for the raw milk. Titratable acidity and bacterial cell counts were also determined 0, 3, 6, 9 and 24 h after introduction of the starter. The average values found for winter, spring, summer and autumn milk are tabulated. The content of volatile fatty acids and diacetyl + acetoin in the final product (prostokvasha) was measured 24 h after addition of the starter. It was found that autumn and winter milk was a better medium than spring/summer milk for development of the culture and production of acetoin + diacetyl, but was less favourable for formation of volatile fatty acids. Growth and aroma production of Str. diacetilactis was greatly reduced in spring milk, with consequent effects on the organoleptic quality of the prostokvasha. Milk from (ii) was less favourable than that from (i) for growth of the culture, but was better for production of aroma compounds, in summer and autumn; this difference was attributed to effects of pasture. ADL

116

[Lactobacillus acidophilus strain 12b - an active acid producer in cheese whey.]
Shilovskaya, T. E.
Prikladnaya Biokhimiya i Mikrobiologiya **12** (3) 477-479 (1976) [3 ref. Ru, en] [All-Union Res. Inst. of Cheese & Butter Ind., Stavropol, USSR]

3% L. acidophilus starter was added to fresh cheese whey (14-16°T acidity) and incubated for 24 h at 37-45°C. As a result of a series of transfers of 10 L. acidophilus strains in cheese whey, a strain with marked acid-producing properties was isolated. This strain was then adapted in tvorog whey (54-60°T acidity). Greatest acidity was achieved at 42-44°C, without diacetyl production. The strain was then cultivated in cheese whey with addition of different salts; max. acid production was obtained in the medium with addition of 0.3% ammonium sulphate + 0.3% ammonium phosphate, in which the strain increased the titratable acidity to 200-210°T after 24 h incubation. The characteristics of the strain are described (Gram-positive, facultative anaerobe; fermenting lactose, galactose, glucose, mannose, maltose, galactitol, mannitol, sorbitol, raffinose, rhamnose, starch, sucrose, but not arabinose, dextrin or xylose; growing in milk at pH 4.0-8.6, in milk with 1:400 or 1:350 phenol, and in hydrolysed milk with 20% bile; etc.). ADL

117

A laboratory batch fermenter with differential electrode pH control.
Richardson, G. H.; Pearce, L. E.
New Zealand Journal of Dairy Science and Technology **11** (2) 83-87 (1976) [7 ref. En] [Utah State Univ., Logan, Utah, USA]

A lactic culture batch fermenter (capacity 250-1500 g) with a differential electrode probe for pH measurement and control is described. The analyser-recorder continuously indicated acid production and neutralization rates during culture growth, and the electrode remained stable through repeated heat treatment and fermentation cycles. The fermenter unit incorporated the protective water-seal and air filtration features of conventional New Zealand bulk starter vessels. AS

118

[Biological properties of milk and quality of cheese from cows grazed on irrigated pasture.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Barabanshchikov, N. V.; Khrisanfova, L. P.
pp. 14-17 (1974) [Ru]

Streptococcus diacetilactis grew better and produced more diacetyl + acetone in the milk from 1 group of cows grazing a plot fertilized with 120 kg N/ha than in the milk from 2 other groups of cows grazing plots treated with 240 and particularly with 360 kg N/ha. Similar effects were noted in the development of the bacteria in the cheese. No differences were observed in physico-chemical properties of the cheese made from the milk of the different groups, but flavour and aroma were better for cheeses from the 1st group. All cheeses were graded as being of high quality. FL

119

[Proteolytic activity of and accumulation of biomass by lactic streptococci in media with added buttermilk.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see

FSTA (1976) 8 11P2200].) [Lecture]
Bogdanov, V. M.; Eremina, V. I.
pp. 229-231 (1974) [Ru] [VNIIMS, Uglich, USSR]

A comparative study was made of some biochemical properties (proteolytic, acid producing and CO_2 producing activities) and accumulation of biomass by mesophilic lactic streptococci (Str. lactis, Str. cremoris, Str. diacetilactis, Str. paracitrovorus and their combinations) grown in sterile skim-milk, with and without 15% buttermilk, in connection with research into the use of buttermilk in the manufacture of 30%-fat cheese. The results showed that the buttermilk had no marked effect on the development of homofermentative lactic streptococci but stimulated the growth of heterofermentative bacteria. FL

120

[Antagonism of lactic acid bacteria against bacteria causing acute gastro-intestinal diseases.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) 8 11P2200].) [Lecture]
Grinevich, A. G.; Makarova, A. P.
pp. 232-234 (1974) [Ru] [Irkutskii Gosudarstvennyi Univ., Irkutsk, USSR]

About 200 strains of lactic acid bacteria (Streptococcus lactis, Str. cremoris, Lactobacillus casei, L. plantarum, etc.) isolated in different areas of Irkutsk region were examined for their antagonistic activity against organisms causing cholera, dysentery, paratyphoid and typhoid, and major findings are discussed briefly. FL

121

[Proteolytic properties of thermophilic lactic streptococci.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) 8 11P2200].) [Lecture]
Ermakova, L. T.; Aseeva, V. Z.; Belov, A. N.
pp. 238-240 (1974) [Ru] [Irkutskii Gosudarstvennyi Univ., Irkutsk, USSR]

Results obtained in studies on 10 strains of Streptococcus thermophilus and 2 of Str. faecalis cultivated in skim-milk, with and without the addition of rennet, at 43°C for 10 days showed great variations in the proteolytic activity of individual Str. thermophilus strains (free amino acid N for 5 strains ranged from 2.267 to 5.999 mg%). Eight strains of Str. thermophilus hydrolysed protein to peptides and are considered to be of particular importance to cheesemaking. Str. faecalis bacteria had a low proteolytic activity. FL

122

[Development of lactic streptococci in milk of increased TS content.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) 8 11P2200].) [Lecture]
Polyakov, V. V.; Silant'eva, L. A.
pp. 246-249 (1974) [Ru] [Leningradskii Tekh. Inst. Kholod. Promyshlennosti, Leningrad, USSR]

During fermentation of whole milk fortified with dried skim-milk or concentrated by evaporation (up to about 42% TS) by a mixture of Streptococcus lactis, Str. cremoris, and Str. diacetilactis, the activity of acid-producing streptococci somewhat decreased with increasing TS content, whilst that of aroma-producers increased, this being reflected in considerably higher diacetyl production. A decrease in the pH value of milk of increased TS content (36-38% TS) ti 5.8-5.9 is obtained in 6-8 h which provides suitable conditions for continuous preparation of milk for coagulation, without significantly affecting the growth of the bacteria. FL

123

[Suitability of dry wort-agar for cultivation of lactobacilli.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) 8 11P2200].) [Lecture]
Lentsner, A. A.; Vyalyaots, M. E.
pp. 250-252 (1974) [Ru] [Tartuskii Gosudarstvennyi Univ., USSR]

Dried wort-agar, produced by the Olainsk factory for the manufacture of chemical reagents, was found suitable as a basis for the preparation of solid media for the study of lactobacilli. FL

124

[Some physiological and biochemical tests for the differentiation of Lactobacillus casei and L. plantarum.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) 8 11P2200].) [Lecture]
Lentsner, Kh. P.; Lentsner, A. A.
pp. 253-255 (1974) [Ru] [Tartuskii Gosudarstvennyi Univ., USSR]

The capacity of 138 strains of L. casei and L. plantarum, isolated from various materials including cheese, to ferment α-methyl-D-mannosite, D-tagatose, melibiose, raffinose and D-arabitol was compared. All L. casei strains were positive in tests on D-tagatose whilst those of L. plantarum were negative. This is considered to be an important criterion for the differentiation of the 2 species. FL

125

[Lipolytic capacity of lactic acid bacteria and its determination in different species.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) 8 11P2200].) [Lecture]
Umanskii, M. S.; Borovkova, Yu. A.; Klimovskii, I. I.
pp. 256-260 (1974) [Ru] [Altaiskii Filial VNIIMS, USSR]

Lipolytic activity of 39 strains of Streptococcus lactis, 13 of Str. diacetilactis, 26 of Str. thermophilus, 13 of Lactobacillus helveticus and 3 of L. lactis was determined by 3 different methods including 1 involving cultivation in milk. In this test Str. diacetilactis showed the highest lipolytic

activity, followed by L. lactis, L. helveticus and Str. thermophilus. Milk is considered to be particularly suitable as a substrate for the study of lipolytic activity of cultures. FL

126

[Hydrolytic effect of some Str. diacetilactis strains on milk fat.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Belov, A. N.; Umanskii, M. S.; Klimovskii, I. I.; Bogdanov, V. M.
pp. 261-263 (1974) [Ru] [Altaiskii Filial VNIIMS, USSR]

In tests with 2 single-strain Streptococcus diacetilactis starters, one with higher lipolytic activity (coeff. 0.32) gave Kostroma cheese of more pronounced flavour and aroma than one with lower activity (coeff. 0.23) (95.0 vs. 88.67 points overall score), and the cheese was better than control cheese (93.0 points). FL

127

[Production of CO_2 by lactic acid bacteria in milk.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Chobanyan, M. K.; Ter-Kazar'yan, S. Sh.
pp. 264-266 (1974) [Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

Production of CO_2 by 245 strains of Streptococcus lactis, Str. faecalis, Lactobacillus plantarum and L. caucasicus [L. lactis] was studied in skim-milk during incubation at 40°C for 24 h. The results for these bacteria isolated from milk, matsun, various cheese varieties and faeces are tabulated. FL

128

[Diacetyl production by thermophilic lactic streptococci in relation to the medium and cultivation conditions.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Sidorova, I. N.; Ermakova, L. T.
pp. 267-270 (1974) [Ru] [Irkutskii Gosudarstvennyi Univ., Irkutsk, USSR]

15 strains selected from 72 strains of thermophilic lactic acid bacteria were tested for diacetyl production in 3 media (whole milk, skim-milk and hydrolysed milk/yeast autolysate). The rates of diacetyl production and of the growth of the bacteria were about the same in both milks. Diacetyl synthesis was related to the composition of the medium and was affected by aeration. FL

129

[Effect of freeze-drying on survival and activity of Streptococcus faecalis and Lactobacillus plantarum.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Arutyunyan, R. S.; Kocharyan, N. A.; Ter-Kazar'yan, S. Sh.
pp. 274-276 (1974) [Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

Experiments on freeze-drying with heating to 12-45°C showed that for Str. faecalis cultures the temp. could be raised to 45°C and for L. plantarum to 35°C, without markedly affecting their survival and acid-producing capacity after reconstitution. FL

130

[Duration of cell division of lactic acid bacteria in an impoverished medium.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Mirzoyan, N. R.; Ter-Kazar'yan, S. Sh.
pp. 279-281 (1974) [Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

The rate of cell division of 120 strains of Str. faecalis, Lactobacillus caucasicus [L. lactis], and L. plantarum (isolated from milk, cheese, etc.) on incubation at 40°C in milk diluted at a ratio of 1:3 and only slightly hydrolysed with pancreatin, averaged 250 min, being about 4× the normal. FL

131

[Properties of Lactobacillus plantarum in relation to its selection for use in cheese starters.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Begapetyan, K. V.; Ter-Kazar'yan, S. Sh.
pp. 309-311 (1974) [Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

230 strains of L. plantarum, isolated from plants, matsun and cheese, were examined for the characteristics important in the selection of starters. The strains had increased acid-producing capacity, medium proteolytic activity, high tolerance to phenol and medium tolerance to salt and are of interest for use in starters for dairy products. FL

132

[Effect of proteolytically active X-ray mutants of lactic acid bacteria on ripening and quality of Sovetskii cheese.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) 8 11P2200].) [Lecture]
Dilanyan, Z. Kh.; Berlaryan, R. A.; Chuprina, D. F.
pp. 326-329 (1974) [Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

In comparative experiments, the use of X-ray mutants of lactic acid bacteria (30 000-50 000 R units optimal) in starters accelerated microbiological and biochemical processes and improved the quality of Sovetskii cheese (mainly due to improved flavour and aroma). FL

133

[Selection of strains of lactic acid bacteria for the production of smetana (cultured cream).] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Dilanyan, Z. Kh.; Melikyan, V. M.
pp. 351-354 (1974) [Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

2 starters for the production of smetana were prepared from 17 strains of lactic acid streptococci selected initially from 60 strains obtained from a culture collection. Acid producing and proteolytic activities of the 17 strains and of the 2 starters are tabulated. FL

134

[Glyceryl ester hydrolase capacity of lactic acid bacteria.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Umanskii, M. S.; Borovkova, Yu. A.; Kozlova, G. A.
pp. 364-367 (1974) [Ru] [Altaiskii Filial VNIIMS, USSR]

% proportions of phospholipids, mono- and 1,2-diglyceride, sterols, free fatty acids and 1,3-diglycerides, triglycerides, and hydrocarbons determined by TLC in 7-day cultures of lactic acid bacteria in sterilized milk and rennet are tabulated for 3 strains of Streptococcus lactis, 2 of Str. thermophilus, 2 of Lactobacillus lactis and 3 of L. helveticus. SKK

135

[Determination of olein-splitting activity of intracellular filterable lipases of lactic acid bacteria.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Umanskii, M. S.; Borovkova, Yu. A.
pp. 368-370 (1974) [Ru] [Altaiskii Filial VNIIMS, USSR]

Lactic acid bacteria were cultured in hydrolysed milk for 48 h, the bacteria were separated by centrifugation, washed, disrupted by ultrasonic radiation and their Seitz filtrate and the Seitz filtrate from the centrifugation supernatant liquid were tested for lipase activity using olive oil as substrate. Activities in conventional units are tabulated for 2 strains of Streptococcus lactis, 2 of Str. diacetilactis, 1 of Str. thermophilus, 1 of Lactobacillus helveticus and 2 of L. lactis. SKK

136

[Esterase capacity of lactic acid bacteria for different Tweens.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Borovkova, Yu. A.; Umanskii, M. S.; Klimovskii, I. I.
pp. 372-374 (1974) [Ru] [Altaiskii Filial VNIIMS, USSR]

Lipolytic activity of 3 strains of Streptococcus lactis, 3 of Str. diacetilactis, 2 of Str. thermophilus, 3 of Lactobacillus helveticus, and 2 of L. lactis in Tween 20, 40, 60 or 80 media was assessed qualitative by the width of the turbid zone formed round the inoculum. The activity was most marked with Tween 40, decreasing thereafter in the order Tween 60 > Tween 20 > Tween 80. Polysorbitan palmitate is recommended on the basis of these findings as substrate for detn. of lipolytic activity of lactic acid bacteria. SKK

137

[Characterization of Streptococcus diacetilactis bacteria in connection with their use in cheesemaking.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Umanskii, M. S.; Belov, A. N.; Belova, L. P.
pp. 375-378 (1974) [Ru] [Altaiskii Filial VNIIMS, USSR]

13 Str. diacetilactis strains were examined for physiological and biochemical characteristics and the results for acidifying activity, lactose requirements, CO_2 and volatile acids production, casein breakdown, and diacetyl and acetoin production are tabulated. Strains considered suitable for use in starters for the production of cheese with low scalding temp. are given. FL

138

[Study of biochemical properties of lactic acid bacteria using model cheeses.] (In "Intensifikatsiya proizvodstva i uluchshenie kachestva natural'nykh syrov" [see FSTA (1976) **8** 11P2200].) [Lecture]
Sarkisyan, R. A.; Kharatyan, V. G.; Balayan, L. M.
pp. 407-409 (1974) [Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

Miniature (500-600 g) Gruzinskii, Tushinskii, Imeretinskii, Suluguni and Gouda cheeses were made by customary methods in the experimental dairy of the Erevan Institute using [? jointly] 14 strains of lactobacilli as starter. The cheeses contained the following % proportions of characteristic free amino acids: lysine 9.8, glutamic acid 13.2, proline 10.6, alanine 4.8, valine 8.4, leucine + isoleucine 14.2 and phenylalanine 7.5. As these quantities are similar to those found by Z. Kh. Dilanyan in good quality USSR cheeses, it is concluded that model cheeses may be used in studying free amino acid formation by individual strains of starter organisms. SKK

139

[Lactobacilli in meat products.]
Cantoni, C.; Aubert, S. d'
Archivio Veterinario Italiano **27** (1/2) 45-54 (1976) [many ref. It, en] [Istituto di Ispezione degli Alimenti di Origine Anim., Univ. degli Studi, Milan, Italy]

Aspects considered in this review include: lactic acid bacteria of significance in meat products; defects attributable to lactic acid bacteria (green

discoloration, slime formation, excessive acidification, rancidity, formation on methyl mercaptan and H_2S, and swelling of the pack as a result of CO_2 formation); factors of importance for maturation of raw cured meat products; occurrence of lactobacilli in other meat products; and industrial applications of lactobacilli. AJDW

140

Streptococci in dried and frozen foods.
Mundt, J. O.
Journal of Milk and Food Technology **39** (6) 413-416 (1976) [33 ref. En] [Dep. of Food Tech. & Sci. & Microbiol., Univ. of Tennessee, Knoxville, Tennessee 37916, USA]

Streptococci were obtained on KF and bile-esculin agars from 209 (57%) samples of various dried foods and from 299 (87%) samples of frozen vegetables; they were not obtained from dried tea, coffee, flavoured drinks, or fruits. Numbers/g were greater in frozen vegetables than in dried foods. Nearly 60% of the 2334 strains isolated were identified as follows: Streptococcus faecalis (8.9%), Str. faecium (21.1%), Str. faecium biotype casseliflavus (18.9%), Str. lactis (2.2%), Str. bovis (0.04%), Aerococcus (2.7%) and Leuconostoc (4.5%). The 1173 strains of unidentified streptococci formed 32 groups when characterized for growth at 10° and 45°C, in broth containing 6.5% NaCl, in broth adjusted to pH 9.6, and for deamination of arginine. The isolated strains were classified into 7 plant streptococcal types. Unidentified streptococci obtained from foods were as variable in their characteristics as those obtained from plants. The variety of species obtained indicated that neither KF nor bile-esculin agars were reliable in the selection of Str. faecalis from foods. AS

141

[Amino acid metabolism of lactic acid bacteria isolated from wine.] Über den Aminosäurestoffwechsel von Milchsäurebakterien aus Wein.
Weiller, H. G.; Radler, F.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung **161** (3) 259-266 (1976) [26 ref. De, en] [Inst. für Mikrobiol. & Weinforschung, Johannes Gutenberg-Univ., Ernst-Ludwig-Strasse 10, D-6500 Mainz, Federal Republic of Germany]

142

[Malolactic fermentation of red table wines, and its control.]
Wyk, C. J. van
Wynboer No. 536, 57-59, 61-63, 65 (1976) [27 ref. Af] [Dep. van Wynkunde, Univ. van Stellenbosch, Stellenbosch, South Africa]

Aspects considered in this discussion of malo-lactic fermentation of wines include: effects on the pH, colour and composition of wines; effects on wine quality (organoleptic properties, acidity, biological stability); factors influencing malo-lactic fermentation (pH, sugar, temp., alcohol, O_2, CO_2, tannins, fermentation procedure, yeast strain used for the alcoholic fermentation, SO_2, fumaric acid); and practical aspects of control (inhibition or stimulation) of malo-lactic fermentation of wines. AJDW

143

Malo-lactic fermentation in South African table wines. (In '4. International Enological Symposium' [see FSTA (1976) **8** 12H2198].) [Lecture]
Wyk, C. J. van
pp. 259-268 (Undated) [17 ref. En] [Univ. of Stellenbosch, Stellenbosch, South Africa]

In order to establish the incidence of malo-lactic fermentation (MLF) in South African wines, the factors affecting the incidence of MLF, and the effect of MLF on wine quality, a study was made of the pH and malate contents of 2000 samples of South African wine, including experimental wines, young unfinished wines, and bottled wines. Other studies examined the relationship between winery practice and incidence of MLF, between vine-growing area, winery and incidence of MLF, and between the quality of young wines and incidence of MLF. Results are tabulated. Of 222 samples of bottled red wine, 430 of unfinished red wine (1971 vintage) and 496 of unfinished red wine (1972 vintage), 147, 133 and 121, respectively, had undergone MLF. Bottled white and rose wines showed no MLF. No relationship existed between MLF and vine-growing area but winery practice had a profound influence on the incidence of MLF. Racking without added SO_2 5-7 days after completion of fermentation produced a high incidence of MLF (e.g. 61.8% in commercial wine) but racking and SO_2 addition immediately after the completion of fermentation resulted in a low incidence of MLF (e.g. 12.2% in commercial wine). MLF seemed to have little effect on wine quality. JA

144

The influence of SO_2, fumaric acid and heat on the lactic acid bacteria in must and wine. (In '4. International Enological Symposium' [see FSTA (1976) **8** 12H2198].) [Lecture]
Radler, F.
pp. 272-277 (Undated) [10 ref. En] [Inst. for Microbiol. and Wine Res., Univ. of Mainz, Federal Republic of Germany]

SO_2 has a bactericidal effect on lactic acid bacteria, but the effect is related to pH. Lactobacillus casei is more resistant to SO_2 than heterofermentative species. In laboratory tests, 12 mg free SO_2 at pH 3.7 inhibited the growth of L. brevis. Fumaric acid can delay the development of lactic acid bacteria and is particularly effective at low pH but the response of different strains varies widely. For example, growth of L. brevis B 73 at pH 3.5 was accelerated by 3 g fumaric acid/l. while growth of L. brevis B 34 was almost completely inhibited under the same conditions. Further studies proved that some strains have an affinity for fumaric acid. D-values were determined at 60°C

and pH 4.4 for Pediococcus pentosaceus (0.07 min), Leuconostoc mesenteroides (0.33 min), L. brevis (0.59 min), L. plantarum (0.82 min), L. casei (1.8 min) and Leuc. oenos (1.9 min). The practical significance of these results is discussed. A low pH and the presence of SO_2 and alcohol would reduce the D-values but the presence of sugar would increase them. JA

145

[Fermented soybean product.]
Nisshin Oil Mills Ltd.
Japanese Patent 5 114 584 (1976) [Ja]

A soybean juice containing sugar is sterilized and inoculated with a mixed starter of Streptococcus lactis and Lactobacillus plantarum, and fermented to yield a product with high protein content and low acidity. IFT

146

[Commercial production of table olives by controlled lactic fermentation. II.]
Balloni, W.; Pelagatti, O.; Brighigna, A.; Paoletti, C.
Annali dell'Istituto Sperimentale per la Elaiotecnica **4**, 167-186 (1974) [15 ref. It, en, fr, es]

Ascolana and Intosso var. olives were prepared by fermentation with 1 of the following techniques: (i) after washing with water; (ii) after washing with acidulated water; (iii) with inoculation with Lactobacillus plantarum (strains A33 and O38) starter cultures, using olives washed in water; and (iv) as (iii), but using acidulated wash water. Changes in the pH of the brine and on its contents of reducing sugars, lactic acid (total acidity), aerobic organisms, coli-aerogenes group organisms, yeasts and moulds, and in the composition of its microflora were studied. The results demonstrated the commercial potential of controlled lactic fermentation using an L. plantarum starter inoculum. [See also FSTA (1975) **7** 11J1627.] HBr

147

[Preparation of rye flour doughs from M-1 liquid starter.]
Siver, V. E.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 12, 36-37 (1975) [Ru] [Tsentral'naya Kontrol'no-proizvodstvennaya Lab. Rosglavkhleba Minpishcheproma RSFSR, USSR]

M-1 (Mytishchinskaya-1) liquid starter accelerates the dough mixing process and produces bread of constant quality, with a good aroma and uniform crumb porosity and elasticity. M-1 is prepared from 6 strains of lactic acid bacteria (A-63, V-5, V-78-Leningrad, R-6, VCh-13-Czech, I-35-Ivanovskaya) and Ivanovskaya yeast. M-1 is used in the production of rye, wheat-rye and rye-wheat bread. It is added to fermenting doughs at the 60% level (flour wt. basis) and to accelerated-fermentation doughs at the 110-120% level (flour wt. basis). Total dough production time is 60-70 min less than with conventional procedures; dough acidity is 8-9°. STI

148

[The effect of a mesophilic starter produced from Lactobacillus fermenti on wheat bread quality.]
Vitavskaya, A. V.; El'tsova, O. P.; Sevryukova, G. F.; Koltushkina, M. I.; Roiter, I. M.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 12, 9-10 (1975) [Ru] [Kazgipropishcheprom, USSR]

Addition of 4% of the starter (flour wt. basis) to the sponge produces a 1.5-h acceleration of sponge fermentation, improves bread quality and eliminates rope formation in bread for 120 h. STI

149

Fermented flour.
Gryczka, A. J. (Microlife Technics Inc.)
United States Patent 3 963 835 (1976) [En]

Rye or wheat flour compositions containing a concentrate of a Lactobacillus cultured at pH 5-6 are fermented to convert sugars to lactic and acetic acid. The mixture is then dried in air at 45-200°C to a moisture content of about 14%. IFT

150

[Some chemico-microbiological parameters of cheeses produced with the aid of porcine pepsin.]
Ovcinnikov [Ovchinnikov], A. D.; Zvjagincev [Zvyagintsev], V. I.; Tolkacev [Tolkachev], A. N.
Nahrung **20** (2) 133-139 (1976) [14 ref. Ru, de, en] [Tech. Inst. Pishchevoi Prom., Kemerovo, USSR]

The contents of non-protein N, bound and soluble N, volatile fatty acids (VFA), free amino acids, carbonyl compounds and lactic acid bacteria were measured in cheeses made with rennet or a 1:1 mixture of rennet and pepsin. During the first 30 days of ripening, the cheese made with rennet and pepsin had higher contents of VFA, amino acids, carbonyl compounds and lactic acid bacteria than the control cheeses. On the 60th day of ripening the composition of the 2 cheeses was similar. It is concluded that a 1:1 mixture of pepsin and rennet can be used to produce cheese without impairing quality or nutritive value. MEG

151

[Effect of H_2O_2 and H_2O_2-reducing enzyme systems on certain lactobacilli cultures.]
Pasolini, B.; Adriana, D.
Mondo del Latte **29** (9) 567-572 (1975) [14 ref. It] [Istituto Superiore di Sanita, Rome, Italy]

Growth curves were determined for Lactobacillus lactis/Streptococcus thermophilus/L. bulgaricus cultures in MRS medium with 80% filtered rennet whey under various conditions (with or without H_2O_2, catalase and/or peroxidase). Milk-clotting activity (in Bacto Skim Milk Difco) and titratable acidity were also determined, as well as residual H_2O_2 by the Arnold-Mantzel and

Gilliland titration methods [see Journal of the Association of Official Agricultural Chemists (1957) 40 (3) 789-792 and FSTA (1969) 1 6P508]. The H_2O_2 (5 µg/ml) inhibited all 3 species, slowing down cell multiplication and prolonging the latent phase. It was inactivated by catalase (0.05 µg/ml) and by catalase + peroxidase but not by peroxidase alone (0.5 µg/ml). The interaction of the 2 enzymes appeared to be correlated to the flavo-protein-peroxidase system of the bacterial cell. Detn. of residual H_2O_2 in the cultures revealed that the H_2O_2 had increased by the end of the experiment in the case of L. lactis, decreased in the case of L. bulgaricus (which breaks it down) and was unchanged in the case of Str. thermophilus. The Arnold-Mantzel method gave different results from the Gilliland method. There were no significant differences in milk-clotting and acidification activity between control cultures and those grown in the presence of H_2O_2. Milk with added H_2O_2 can therefore be used in fermentation processes if previously treated with the catalase-peroxidase enzyme system to restore its natural physicochemical properties. ADL

152

[Studies on production of flavour constituents by various lactic acid bacteria. VI. Isolation of intracellular lipases of various lactic acid bacteria and their characteristics.]
Yu, J. H.; Nakanishi, T.
1278ch **24** (4) A155-A160 (1975) [14 ref. Ja, en] [Lab. of Chem. & Tech. of Anim. Products, Fac. of Agric., Tohoku Univ., Sendai, Japan]

The presence of intracellular lipases was demonstrated in cultures of Lactobacillus casei, L. helveticus, L. plantarum, L. acidophilus, Streptococcus lactis and Leuconostoc citrovorum but not in Str. thermophilus, Str. Cremoris or L. bulgaricus. In general the lipases had optimum activity at pH 7 and 37°C. [From En summ.] MEG

153

Autolytic properties of some lactic acid bacteria used in cheese production. II. Experiments with fluid substrates and cheese.
Bie, R.; Sjöström, G.
Milchwissenschaft **30** (12) 739-747 (1975) [13 ref. En, de] [Lund Univ., Div. of Tech. Microbiol., Alnarp, Sweden]

Methods described in part I [FSTA (1976) 8 7P1339] were used to determine autolysis rates and, in some cases, proteolysis rates of a mixed strain starter (FDS) and 2 strains of Lactobacillus helveticus under various conditions. In fluid substrates, automysis of FDS was promoted by 2% casein alone and in the presence of $Na^+ \pm Ca^{2+}$. Mg^{2+} and Ca^{2+} retarded autolysis, even in the presence of Na^+. Autolysis rate increased with increasing pH from 5.23 to 5.95, and appeared to be retarded at pH 4.96; it increased with storage temp. and was rapid at 19°C. Sublethal heat treatment (20 s at 54-64°C) of mass cultures increased autolysis with increasing temp., but even non-heated mass cultures showed considerable autolysis at the start of the experiments (30% at pH 5.25, age of culture 16 h). Repeated freezing/thawing indicated a relationship between proteolysis and DNA-leakage. Results of tests on laboratory-made cheeses generally confirmed those obtained with fluid substrates, and suggested a possibility of using the DNA method with fluid casein substrate for screening lactic acid bacteria for cheese production. Addition of sublethally heated mass culture of L. helveticus to normal starter imparted a new pleasant taste and aroma to the cheese. CDP

154

Relation of Cheddar cheese ripening to bacterial lipolysis.
Umemoto, Y.; Sato, Y.
Agricultural and Biological Chemistry **39** (11) 2115-2122 (1975) [27 ref. En] [Dep. of Food Sci. & Tech., Fac. of Agric., Nagoya Univ., Nagoya, Japan]

This investigation was undertaken to find the relationship between fat hydrolysis and lipolytic activities of lactic acid bacteria during Cheddar cheese ripening. Increases in titratable acidities due to lactic fermentation occurred during early stages of ripening. Ripening indices (ratio of water-soluble N to total N) increased rapidly during the first 90 days and thereafter gradually up to the 150th day of ripening. Considerable amounts of free fatty acids were released from cheese fat throughout ripening. Cheese bacteria were enumerated on the tomato-glucose-agar and acetate-agar media. About 70% of bacteria isolated from cheese ripened for 150 days were classified as Lactobacillus casei and L. plantarum. Lipolytic activities of isolated lactobacilli were detected on double-layered agar plates containing Victoria blue-stained olive oil. Lipase activities were determined in cheese extracts during ripening. AS

155

[Some factors affecting the biological properties of milk.]
Khrisanfova, L. P.; Bubnova, V. P.
Doklady TSKhA [Sel'skokhozyaistvennaya Akademiya imeni K. A. Timiryazeva] No. 210, 87-92 (1975) [6 ref. Ru]

3 groups (i)-(iii) of 8 Holstein-Friesian cows each received rations of 4 kg hay, 15 kg root crops and 300 g concentrates/kg milk, plus (i) 30 kg maize silage, (ii) 20.6 kg mixed haylage or (iii) cow-parsnip silage. Their milk was 'pasteurized' at 85-87°C or sterilized for 10 min at 112°C, and a 24-h culture of Streptococcus diacetilactis strain 3 (5% of milk vol.) was added. The milk was incubated at 30°C until coagulum was formed (6 h), then refrigerated. 'Pasteurized' milk from (ii) proved the best medium for growth, acid production and diacetyl + acetoin production. The sterilized milks gave much poorer results. Milk from groups (i)-(iii) respectively contained 3.8, 5.9 and 4.7 µg/l.

cyanocobalamin, 3.5, 3.3 and 3.5 mg/l. pantothenic acid and 294, 202 and 265 µg/l. pyridoxine before heat treatment, but sterilization reduced the cyanocobalamin, pantothenic acid and pyridoxine contents by 95, 14 and 58% respectively. 'Pasteurization' had much less effect on the vitamin content. After 24 h growth of the culture, the amount of cyanocobalamin and pyridoxine had increased in the 'pasteurized' milk, with little change in biotin and pantothenic acid, whereas in the sterilized milk the pyridoxine, pantothenic acid and biotin had decreased. It is postulated that in the sterilized milk the culture uses pyridoxine to compensate for the absence of other essential substances, and that it needs exogenous cyanocobalamin only in the intensive growth phase (first 3-6 h), if at all. ADL

156

Sausage preservation.
Olsen, R. H.; Rothchild, H. (Microlife Technics Inc.)
United States Patent 3 960 664 (1976) [En]
Sausage for frozen storage is preserved by the incorporation of a neutralized concentrate of live cells of Pediococcus cerevisiae. IFT

157

[Freeze-dried starter cultures for the meat industry.]
Lyophil getrocknete Starterkulturen für die Fleischindustrie.
Rohde, R.; Weckend, B.
Fleisch **30** (3) 56-59 (1976) [7 ref. De] [Section Nahrungsgüterwirtschaft & Lebensmitteltech. Humboldt-Univ., Berlin (GRD)]
Studies on freeze-drying of Pediococcus cerevisiae strain 30 for use as a starter in meat products are described. Starter cultures were freeze-dried at -56°C. A gelatin/sucrose medium gave the best results; skim-milk was also an effective protective medium. Quality of the freeze-dried starters was evaluated on the basis of count of starter organisms, sugar-fermentation activity, nitrate reduction, catalase activity, and reddening and texture of the product. Effects of storage conditions, container type, transport conditions, etc. on survival of the starter organisms are discussed. IN

158

[Polyphosphates in meat products. Bacterial hydrolysis of hexametaphosphate and tripolyphosphate.]
Cantoni, C.; Dragoni, I.; Cattaneo, P.
Industrie Alimentari **15** (6) 79-80, 82 (1976) [29 ref. It, en] [Istituto di Ispezione degli Alimenti di Origine Anim., Fac. di Med. Vet., Miland, Italy]
Hydrolysis of hexametaphosphate or tripolyphosphate (at concn. of 0.100 or 0.200%) in liquid media by 5 strains of lactobacilli and 10 strains of micrococci (isolated from cured meat products) was studied; all strains studied were capable of hydrolysis of these polyphosphates. In a second study, hydrolysis of polyphosphates in samples of 'wurstel' sausages containing 0.4% of a commercial polyphosphate mixture during storage for ≤9 days at 0°, 20° or 36°C was studied. Polyphosphate hydrolysis increased with increasing temp. and increasing storage time. Lactobacilli predominated in the microflora. AJDW

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H. BROOKES

ASSISTANT EDITOR

1

[Inhibition of the biological degradation of acids by SO_2-forming yeasts.] Hemmung des biologischen Säuereabbaus durch SO_2-bildende Hefen.
Mayer, K.; Vetsch, U.; Pause, G.
Schweizerische Zeitschrift fiir Obst- und Weinbau **112** (4) 89-92 (1976) [11 ref. De]
[Eidgenössische Forschungsanstalt, Wädenswil, Switzerland]

700-ml samples of grape must sterilized by filtration were fermented at 18°C under exclusion of air in 1-l. flasks with a 10 ml suspension of 1 of 10 yeast strains until the sugar content became <0.5 g/l. The resultant wines were held at 5°C for 3 days, sterilized by filtration, and filled into 100-ml sterile containers; 1 ml of a culture in wine of 'Teufen' strain Leuconostoc oenos was added, and the containers (closed by screw tops) were incubated at 15-16°C, for ≤27 days, numbers of Leuconostoc being determined at intervals. Values for initial SO_2 contents and Leuconostoc numbers are tabulated for (i) Clevner 1974 and (ii) Riesling × Sylvaner wines. In (i), initial SO_2 content ranged from 3 to 48 mg/l. depending on yeast strain; corresponding numbers of Leuconostoc were respectively 91 and 11 million/ml on the 11th day, and 210 and 218 million/ml on the 27th. Corresponding values for (ii) were 6 - 80 mg/l., and 74 and 1.4 million/ml (12th day) and 132 and 1.1 million/ml. In a further test with a mixed-grape wine incubated for 54 days, initial SO_2 contents ranged from 5 to 57 and 64 mg/l.; corresponding numbers of Leuconostoc after 54 days were 220, 2.6 and 2.2 million/ml, respectively; in the latter 2 wines, malic acid had not been degraded. It is recommended using yeasts producing little or no SO_2 for fermentation. SKK

2

[Content of SO_2-binding compounds in wine: effect of fermentation and biological breakdown of acids.] Gehalte an SO_2-bindenden Stoffen in Wein: Einfluss von Gärung und biologischem Säureabbau.
Mayer, K.; Pause, G.; Vetsch, U.
Schweizerische Zeitschrift für Obst- und Weinbau **112** (14) 309-313 (1976) [8 ref. De]
[Eidgenössische Forschungsanstalt, Wädenswil, Switzerland]

Several grape musts were fermented with different yeast strains and then incubated with 'Teufen' strain or with 1 of 5 other strains of Leuconostoc oenos under conditions essentially similar to those described in the preceding abstr.; contents of acetaldehyde, pyruvic acid and glutaric acid, and calculated SO_2-binding capacity are tabulated for the different experiments. In general, yeast fermentation caused a marked increase, and incubation with Leuconostoc oenos caused a marked decrease, in contents of SO_2-binding substances; pyruvic acid was virtually eliminated by the incubation. Use of yeasts producing little SO_2 together with biological degradation of acids is considered best for production of wines with low SO_2 content. SKK

3

[Biological correction of wine acidity.]
Paronetto, L.
Enotecnico **12** (7) 16-21 (1976) [It]

Problems of excess acidity of wines are discussed, with special reference to the value of malo-lactic fermentation (MLF) for minimization of this defect. Aspects considered include: organisms responsible for MLF; factors influencing MLF; chemistry of MLF; effects on the organoleptic properties of the wine; measures for promoting or inhibiting MLF; and the potential for use of enzymes. Malo-alcoholic fermentation is also briefly discussed. AJDW

4

[Lactobacillus bavaricus recovery in a pure culture and use for lactic acid fermentation of plant material.] Lactobacillus bavaricus, seine Gewinnung in Reinkultur und Verwendung zur milchsauren Vergärung von pflanzlichem Material.
Eden-Waren GmbH
German Federal Republic Patent Application 2 440 516 (1976) [De]

Lactobacillus bavaricus 136, which has been found suitable for fermenting sauerkraut and cucumbers pickled in brine at temp. <10°C and even <5°C, is produced by distributing diluted plant material, particularly sauerkraut, which has been fermented by lactic acid in a number of culture media. Organisms which do not produce visible colonies at an incubating temp. of <10°C and/or in the presence of 5% cooking salt after 8 days, or those which produce gas or D(-)- or DL-lactic acid with sugar are eliminated. W&Co

5

[Lactobacillus bavaricus recovery in a pure culture and its use for fermentation of plant material.] Lactobacillus bavaricus, seine Gewinnung in Reinkultur und Verwendung zur milchsauren Vergärung von pflanzlichem Material.
Eden-Waren GmbH
German Federal Republic Patent Application 2 462 152 (1976) [De]

Lactobacillus bavaricus is a new microorganism which produces almost exclusively L(+)-lactic acid and is suitable for fermentation of vegetables [see preceding abstr.], fruit and fruit juices, while preserving temp. sensitive components, e.g. vitamins, aroma compounds and colorants. W&Co

6

[Effect of staphylococcal enterotoxins on acidifying activity of lactic acid bacteria.] Die Beeinflussung der Säureaktivität von Milchsäurebakterien durch Staphylokokkenenterotoxine.
Schwab, H.
Schweizerische Milchwirtschaftliche Forschung 5 (July) 85-89 (1976) [9 ref. De] [Abteilung Lebensmittelkontrolle, Eidgenössisches

Gesundheitsamt, Bern, Switzerland]

Strains of Lactobacillus helveticus, L. lactis, L. bulgaricus, Streptococcus thermophilus and Str. lactis obtained from the Swiss Federal Dairy Research Institute were cultured in the presence or absence of 1 of 5 preparations of staphylococcal enterotoxins supplied by SERVA Feinbiochemica, Heidelberg (Federal Republic of Germany). It is concluded from tabulated results on acidity production that the toxins had an inhibitory effect, more marked with the lactobacilli than with the streptococci. The possibility of using the phenomenon for enterotoxin detection is discussed. SKK

7

[Optimization of lactic streptococci culturing in production of bacterial concentrates.]
Vainberg, I. A.
Molochnaya Promyshlennost' No. 6, 15-17 (1976) [9 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Optimization of production of bacterial concentrates was studied with reference to concn. of lactose in the medium (LM) and concn. increment of lactic acid (IL). A mathematical equation was derived linking the specific growth rate of lactic streptococci with LM and IL reflecting the simultaneous inhibition of the growth by lactose (if in excess) and by lactic acid. It was shown experimentally that for Str. lactis 203, max. rate was achieved at LM = 0.5% and LI = 0. To achieve the latter, constant neutralization of forming lactic acid by automatic regulation is essential. SKK

8

[Antimicrobial activity of thermophilic lactobacilli. I. Review of literature and effect of cultural conditions.] Antimikrobielle Aktivität thermophiler Laktobacillen. I. Literaturübersicht und Einfluss der Kulturbedingungen.
Spillmann, H.
Schweizerische Milchwirtschaftliche Forschung 5 (July) 77-83 (1976) [39 ref. De] [Inst. für Lebensmittelwissenschaft, ETH, Zürich, Switzerland]

Yoghurt starter and cultures of 2 strains of Lactobacillus acidophilus and 1 of L. bulgaricus were grown at different incubation temp. and different inoculum size, or were incubated under aerobic conditions, or were held for 21 days at 8°C. The antimicrobial activity of the different experimental variants and also of disrupted microbial cells was measured using Escherichia coli, Staphylococcus aureus, Pseudomonas fluorescens and Bacillus subtilis. As control for each test, milk of the same pH (lactic acid addition) was used. No formation of inhibitors was detected in any of the tests, there being virtually no difference in inhibition between the test cultures and controls. SKK

9

The production of yoghurt by continuous fermentation.
Macbean, R. D.
Dissertation Abstracts International, B 36 (9) 4601 (1976) [En] Microfiche obtainable from Univ. of New South Wales [Univ. of New South Wales, PO Box 1, Kensington, NSW 2033, Australia]

Yoghurt of normal flavour and texture was produced using a mixed culture of Lactobacillus bulgaricus LB1 and Streptococcus thermophilus TS2 in a first stage pH-stat continuous fermenter at pH 5.5. However yoghurt of poor texture resulted from use of a pilot scale second stage plug-flow fermenter. The most important factors disrupting plug flow appeared to be turbulence at the top of the column and adhesion of the coagulum to the wall of the fermenter. The major factor influencing poor product quality was a disturbance of the coagulum as it was forming at about pH 5. A theory was formulated to explain the stability of mixed cultures in pH-stat continuous fermentation. LMB

10

[Possible connections between protein degradation and late fermentation in Emmental cheese.]
Mögliche Zusammenhänge zwischen Eiweissbbau und Nachgärung im Emmentalerkäse.
Steffen, C.; Puhan, Z.
Schweizerische Milchwirtschaftliche Forschung 5 (July) 51-54 (1976) [18 ref. De] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld-Bern, Switzerland]

158 samples of Emmental cheeses were obtained from commercial stores; (i) 81 samples represented cheeses with evident late fermentation, and (ii) 77 represented sound cheeses. To assess the extent of proteolysis, the samples were examined for leucine aminopeptidase activity by the p-benzoquinone reaction [see Lorenz, Zeitschrift für Analytische Chemie (1974) 269, 182], for trichloroacetic acid-soluble compounds using the Folin & Ciocalteu reaction, and by polyacrylamide gel electrophoresis; and contents of total, D-, and L-lactic acids were determined. It is concluded that protein degradation was more intensive in (i) than in (ii). Particularly marked were differences between (i) and (ii) in leucine aminopeptidase activity (mean values with SD, 25.7 ± 14.7 IU vs. 11.3 ± 10.2 IU), and in lactate content (total, 28.7 ± 20.5 vs. 45.8 ± 20.7 μmol/g) taken to indicate more rapid utilization of lactate by propionic acid bacteria. It is concluded that late fermentation is caused by propionic acid bacteria, the proteolytic activity of lactic acid bacteria possibly also influencing the process. [See also FSTA (1976) 8 5P882.] SKK

11

[Study and selection of cultures of mesophilic lactic streptococci.]
Bannikova, L. A.; Zadoyana, S. B.; Pyatnitsina, I. N.
Molochnaya Promyshlennost' No. 6, 7-11 (1976) [Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

The 2 methods used in the authors' Institute for selection of stable strains of lactic streptococci for use in manufacture of cultured milk products [see FSTA (1975) **7** 12P2698], namely production of mutants and search among strains isolated from natural sources are outlined. Long-term data on acidifying activity of a number of mutants are tabulated in relation to season; and seasonal differences in acidifying activity and acetoin and diacetyl production are given for several homogeneous (stable) and heterogeneous cultures. It is concluded that spring (May in particular) offers the best possibilities for study of properties of lactic streptococci and selection of active and stable strains, because of the relative deficiency of bacterial growth factors in milk at that time. Suitable application of the selection methods outlined above makes possible production of high quality cultured milk production at all seasons. SKK

12

A process for the production of a balanced, viable and living culture of Lactobacillus bulgaricus and Streptococcus thermophilus.
Anderson, L. (Mjölkcentralen Arla, Ekonomisk Forening)
British Patent 1 431 809 (1976) [En]

A process for producing a balanced viable culture of L. bulgaricus and Str. thermophilus in the cell ratio 40:60% to 60:40%, involves adding 250 g lysine, 100 g cystine, and 1.6 mg cyanocobalamin to 100 l. skim-milk, which had been concentrated to 21% TS, inoculation with yoghurt bacteria, incubation for 5½ h at about 45°C and drying at preferably 75-80°C. Samples prepared using this method had a cocci:rods ratio of 50:50 and produced acid at a higher rate than cultures made without the additives, this being particularly the case when the drying temp. was 80°C. FL

13

Use of X-ray and gamma-induced mutants of lactic acid bacteria in the manufacture of dairy products.
Dilanian, Z. [Dilanyan, Z. Kh.]; Makarian, K. [Makaryan, K. V.]; Chuprina, D.
Milchwissenschaft **31** (4) 217-221 (1976) [16 ref. En, de] [Yerevan Zoovet. Inst., USSR]

Mutants with enhanced proteolytic activity were produced by X-ray irradiation, and their inclusion in starters for Armianskii cheese increased the rate of cheese ripening by 25% [FSTA (1976) **7** 8P1727]. In other experiments, γ-irradiation was used to produce mutants, for use in matsun production, that showed a greater chance of survival in the alimentary tract and that showed antibiotic activity towards common intestinal pathogens. The mutant Lactobacillus lactis 1621/I-m showed high phenol stability and antibiotic activity towards some intestinal pathogens, and the possibility of its increasing the therapeutic effect of the product when included in starters for sour milk products is suggested. Morphological changes observed following X-ray irradiation at ≥10 000 R are described. CDP

14

[The problem of the biochemical cause of late fermentation in Emmental cheese. Some suggestions for further study.] Zur Frage der biochemischen Ursache der Nachgärung des Emmentalerkäses. Einige Anregungen zu weiteren Untersuchungen.
Ritter, W.
Deutsche Molkerei-Zeitung **97** (23) 680-684 (1976) [58 ref. De] [CH 3028 Spiegel bei Bern, Switzerland]

The view, recently expressed by Kielwein [FSTA (1976) **8** 8P1496], that enterococci, Streptococcus durans and Str. faecium in particular, are the causative agents of late fermentation is discussed. In unpublished work, the author found that some enterococci present in late-fermenting Emmental cheese are capable of decarboxylating tyrosine and arginine, and it is suggested that this decarboxylation with CO_2 formation may be instrumental in late fermentation. Further studies of Emmental cheese along these lines are advocated. [See also following abstr.] SKK

15

[Facts and thoughts on the cause of late fermentation in Emmental cheese. At the same time a comment on the article 'The problem of the biochemical cause of late fermentation in Emmental cheese' by Dr. W. Ritter (Deutsche Molkerei-Zeitung (1976) 97 (23) 680).] Tatsachen und Gedanken zur biochemischen Ursache der Nachgärung von Emmentalerkäse. Zugleich Stellungnahme zum Artikel "Zur Frage der biochemischen Ursache bei der Nachgärung des Emmentalerkäses" von Dr. W. Ritter ("dmz" Nr. 23 vom 3. Juni 1976).
Kielwein, G.
Deutsche Molkerei-Zeitung 97 (28) 840-843 (1976) [12 ref. De] [Justus-Liebig Univ., Giessen, Federal Republic of Germany]

It is concluded from cited publications of the author and of his colleagues that, contrary to Ritter's views [see preceding abstr.], decarboxylation of amino acids cannot be the cause of late fermentation in Emmental cheese; and it is reiterated that the phenomenon is due to vigorous gas formation by propionibacteria in the presence of suitable concn. of L-lactate and glutamic acid formed by Streptococcus faecium and Str. durans. SKK

16

New development in cultures.
Christensen, V. W.
Dairy Industries International **41** (4) 123-127 (1976) [En] [Marschall Div., Miles Lab. Inc., Madison, Wisconsin, USA]

In this article, based on a paper read at the Annual Meeting of the American Dairy Science Association (1975), the history of and developments in cheese, butter, cultured milk products and bioprocessed foods industries are briefly reviewed in relation to lactic culture developments; particular emphasis is placed on the development of cheese starters. CDP

17

Numerical relationship between strains in frozen concentrates of lactic streptococcal starter cultures.
Leach, R. D.; Sandine, W. E.
Journal of Dairy Science **59** (8) 1392-1397 (1976) [18 ref. En] [Dep. of Microbiol., Oregon State Univ., Corvallis, Oregon 97331, USA]

Strain dominance was revealed in 2 multiple strain lactic streptococcal starter concentrates (each containing 3 different strains of Str. cremoris) by addition of phages specific for the component strains. The strains showed clear dominance when tested 3-4 wk after freezing and storage at -20°C. In 1 starter, dominance persisted throughout 10 months of storage. In the 2nd starter dominance decreased over 8 months storage, and the lag phase increased from 1 to 4 h. Plate counts showed only a 2-fold difference in cell numbers between uninfected and phage-infected dominant strain cultures. Differential survival and recovery from freezing are suggested as factors in production and alteration of the dominance pattern. AS

18

[Study of continuous milk fermentation by lactic streptococci with multi-stage equipment in the laboratory.]
Vasil'ev, N. F.; Krasnikova, L. V.; Silant'eva, L. A.; Novotel'nov, N. V.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 2, 108-110 (1976) [7 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, USSR]

Continuous fermentation of milk by a mixed culture of lactic streptococci in 1-, 2- and 3-stage cultivation was studied in a laboratory with multi-stage equipment. Total productivity of growth was determined by measuring concn. of lactic acid. Growth of the bacteria in milk of an increased DM content resulted in a 0.6% less lactose consumption which caused production of a smaller concn. of lactic acid. A higher DM content in a continuous fermentation also increased the biochemical activity of aroma-forming bacteria. STI

19

[Fermented soybean milk.]
Japan, Ministry of Agriculture & Forestry
Japanese Patent 5 122 070 (1976) [Ja]

Soybean milk is fermented by treatment with Streptococcus to yield a product useful in producing lactic acid beverages or cheese analogues. IFT

20

[Lactic acid beverage.]
Kirin Brewery Co. Ltd.
Japanese Patent 5 124 587 (1976) [Ja]

An enzyme produced by fermenting Arthrobacter luteus is used in the preparation of a milky beverage containing lactic acid bacteria which is free from yeast odour and highly nutritious. IFT

21

[Use of pure cultures of Bifidobacterium bifidum in twarog production.]
Kruk, A.; Kisza, J.; Ziajka, S.; Ozimek, L.
Roczniki Instytutu Przemyslu Mleczarskiego **18** (2) 29-37 (1976) [11 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

Twarog was made from the total skim-milk proteins [coprecipitate] by the heat/Ca method (calcium chloride or calcium lactate) and either acidification alone or with renneting and using a B. bifidum starter (mixture of 3 strains), a butter starter or a mixture of both. Compositional data are tabulated for the milk, whey and twarog. It is concluded that B. bifidum is suitable for twarog manufacture; best results were obtained using 0.06% calcium lactate, 4% of a 3:1 mixture of B. bifidum and butter starters and 2-stage development of acidity (37-42°C for approx. 3 h and then 20-22°C for approx. 5-5.5 h). SKK

22

Morphologies and host sensitivities of lactic streptococal phages from cheese factories.
Terzaghi, B. E.
New Zealand Journal of Dairy Science and Technology **11** (3) 155-163 (1976) [16 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

23

[Studies on production of flavour constituents by various lactic acid bacteria. III. Effect of milk fat on production of free amino acids by various lactic acid bacteria.]
Yu, J. H.; Nakanishi, T.
1278ch **24** (2) A63-A68 (1975) [14 ref. Ja, en] [Lab. of Chem. & Tech. of Anim. Products, Tohoku Univ., Sendai, Japan]

6 species of lactic acid bacteria were incubated at 30° or 37°C in skim-milk and whole milk as

described in parts I and II [FSTA (1975) 7 12P1274 & 12P1275]. Presence of milk fat had little effect on production of free amino acids. After 72 h incubation, the production of 17 free amino acids by lactic acid bacteria decreased progressively as follows: Lactobacillus bulgaricus, L. casei, Streptococcus lactis (527), L. acidophilus, Str. thermophilus, Str. cremoris. Str. lactis also produced an unidentified free amino acid. Tryptophan was produced only by the lactobacilli. [From En summ.] [See also following 2 abstr.] CDP

24

[Studies on production of flavour constituents by various lactic acid bacteria. IV. Effect of milk fat on production of free volatile fatty acids by mixed lactic acid bacteria.]
Yu, J. H.; Nakanishi, T.
1278ch **24** (2) A79-A82 (1975) [14 ref. Ja, en] [Lab. of Chem. & Tech. of Anim. Products, Tohoku Univ., Sendai, Japan]

Production of free volatile fatty acids (VFA) by mixed cultures of (i) 1:1 Streptococcus thermophilus and Lactobacillus bulgaricus, (ii) 4:3:3 Str. thermophilus, L. bulgaricus and L. acidophilus, and (iii) 1:1 Str. lactis and Str. thermophilus was studied using GLC. Starters (i) and (ii) were incubated at 37°C and (iii) at 30°C. Total VFA (ml 0.1N NaOH/100 g) in skim-milk and whole milk respectively after 72 h was: (i) 7.20 and 7.55; (ii) 6.99 and 6.89; and (iii) 5.94 and 6.80. More of each individual VFA tended to be produced by (i) and (ii) than by (iii). In general, more C2 and C4 but less C6, C8 and C10 fatty acids were produced in whole milk than in skim-milk. C3 fatty acid was produced in only small amounts and only in whole milk. The VFA produced in the greatest amounts by all 3 cultures were n-C4, n-C6, C8 and C10. [From En summ.] [See also preceding and following abstr.] CDP

25

[Studies on production of flavour constituents by various lactic acid bacteria. V. Effect of milk fat on production of volatile carbonyl compounds by mixed lactic acid bacteria starter.]
Yu, J. H.; Nakanishi, T.
1278ch **24** (3) A117-A120 (1975) [18 ref. Ja, en] [Lab. of Chem. & Tech. of Anim. Products, Tohoku Univ., Sendai, Japan]

Production of volatile carbonyl compounds (VCC) by the mixed cultures described in the preceding abstr. was studied quantitatively in skim- and whole milk using GLC. The predominant VCC produced by all 3 cultures was acetaldehyde, levels of which decreased between 24 and 72 h in skim-milk, but showed little change during that period in whole milk. Other VCC detected, which were present in all 3 cultures, were formaldehyde, acetone and 2-heptanone; n-pentaldehyde and diacetyl, which were present in single strain cultures [see part II], were not found in the mixed cultures. [From En summ.] CDP

26

[Development of lactic acid bacteria in milk with increased protein and total solids content.]
Mochalova, K. V.
Molochnaya Promyshlennost' No. 7, 24-28 (1976) [4 ref. Ru] [Belorusskii Filial Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

5% Streptococcus lactis, Str. cremoris, Str. acetoinicus, Str. diacetilactis, Str. paracitrovorus, or Lactobacillus casei culture or 5% butter, cheese or yoghurt starter were added to samples of reconstituted skim-milk as such or supplemented with 1, 3 or 7% dried sodium caseinate. The samples were incubated for 48 h at the respective optimal temp., and bacterial cell counts, acidity, and (where relevant) formation of diacetyl and/or acetoin were determined at intervals. Addition of protein as sodium caseinate increased growth of the lactic acid bacteeria studied either singly or in starters. Reconstituted skim-milks containing 13.5% or 16.5% DM were prepared by addition of sodium caseinate or dried skim-milk; 5% cheese starter was added to the 4 variants and the mixtures were incubated for 24 h; growth of lactic acid bacteria proceeded more rapidly in the samples containing sodium caseinate. SKK

27

[Biochemical types of group-B streptococci.]
Jensen, N. E.
Nordisk Veterinaermedicin **28** (9) 434-443 (1976) [24 ref. Da, en] [Statens Vet. Serumlab., Odinsvej 4, DK-4100 Ringsted, Denmark]

The biochemical characteristics of 1060 strains of group-B streptococci isolated in Denmark in the period Nov. 1974-Aug. 1975 (78 strains isolated from bulk milk samples, 982 strains from infected quarter milk samples) were studied; tables of results are given, and discussed in relation to mastitis. Results for the bulk milk samples suggest contamination of the milk with streptococci from non-bovine sources; at least one biochemical type of streptococci found in the bulk milk is probably of human origin. AJDW

28

[Improvement of starter quality.]
Shmeleva, L. I.; Fal'k, E. Yu.; Mikhailova, I. V.; Shamraeva, N. D.
Molochnaya Promyshlennost' No. 7, 28-31 (1976) [4 ref. Ru] [Vses. Nauchno-issled. Inst. Zhirov, USSR]

2 strains of Streptococcus diacetilactis, 3 of Str. lactis and 2 of Str. cremoris were grown in hydrolysed milk broth, transferred to hydrolysed milk agar for 24 h at 30°C, and culture suspensions in sterile water at 100 000 million cells/ml were exposed to γ-radiation at 5 rad/s, the absorbed dose being on average 100 000 rad; cell survival was 0.004-2%. Mutants vigorously producing diacetyl were selected by size of clear zone on solid calcium citrate medium. 10 particularly promising strains were chosen from among 120 diacetyl-forming mutants and were tested monthly for 3 yr alone or

combined into starters for formation of diacetyl and acidity and for organoleptic properties. Str. lactis, Str. cremoris and Str. diacetilactis mutants thus obtained were equal in these characteristics to known strains of Str. diacetilactis; they were successfully used in the authors' Institute as starters for milk used in margarine manufacture. SKK

29

[New microbiological and technological aspects of yoghurt production.] [Lecture]
Bottazzi, V.
Scienza e Tecnica Lattiero-Casearia **26** (6) 401-426 (1975) [14 ref. Fr, It] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

This review deals with microbiological aspects of yoghurt production, including proteolysis and the composition of polysaccharides secreted by Lactobacillus bulgaricus. It outlines the preparation of starter cultures for 3 strains of Streptococcus thermophilus and 2 strains of L. bulgaricus. 3 methods of production of yoghurt are described, including one involving fermentation at 42°C to pH 4, heating to 65°C, setting at 8-10°C for 15-20 h followed by stirring and aseptic packaging. JMD

30

Selection and some properties of phage-resistant starters for cheese-making.
Marshall, R. J.; Berridge, N. J.
Journal of Dairy Research **43** (3) 449-458 (1976) [15 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT UK]

Clones of Streptococcus lactis and of Str. cremoris resistant to some bacteriophages that could virtually annihilate the parent strains were selected by plating very large numbers of the bacteria in the presence of the phage. Some of the resistant strains were shown to form acid rapidly in milk and to be satisfactory for cheesemaking. They were not lysogenic. Adsorption of the phage to which the parent culture had been sensitive still occurred with 3 strains but not with 4 others. Rates of mutation from phage sensitivity to phage resistance were determined for 2 original strains of Str. lactis and were found to be of the same order as the rates quoted in the literature for other mutations [see Journal of Dairy Research (1960) **27** (2) 161-164]. The mutation rates of phages to forms which could attack the resistant strains were too low to be measured. AS

31

[Study of toxic effects of low Sterinol concentrations on selected strains of bacteria. I. Effect on acidifying activity of lactic acid bacteria.]
Wajda, A.
Zeszyty Naukowe Akademii Rolniczo-Technicznej w Olsztynie No. 151 (Technologia Zwynosci 8) 113-121 (1976) [7 ref. Pl, ru, en] [Inst. Inzynierii i Biotech. Zywnosci, ART, Olsztyn, Poland]

The activity was tested of the Sterinol quaternary ammonium compound (manufactured by Polfa, Poland) against Streptococcus lactis 156 and Str. diacetilactis from the Pure Culture Laboratory in Olsztyn of the (Polish) Central Union of Dairy Co-operatives, and Lactobacillus helveticus T78 from the collection of the author's Institute. Reconstituted skim-milk (10% TS) was inoculated with 1% 24-h culture of the above strains, 0, 0.1, 1, 10, or 110 ppm Sterinol active substance were added, and the samples were incubated for 12 h at 30°C for the streptococci and 40°C for the lactobacillus. pH and titratable acidities were determined every 2 h. Sterinol at 10 and 100 ppm exerted a marked inhibitory action, but had no significant effect at 0.1 or 1 ppm. [See following abstr. for part II.] SKK

32

A food scientist looks at fermented sausages.
Palumbo, S. A.
Abstracts of Papers, American Chemical Society **172**, AGFD 37 (1976) [En] [E. Regional Res. Cent., USDA, Philadelphia, Pennsylvania 19118, USA]

The ripening period for European dry sausages involves storage at 20°C during which the sausages acquire their characteristic flavour, texture, and colour. During this period, enzymes, generally of microbial origin, attack various substrates in the sausage. The relationship between bacterial flora and their enzyme systems, the substrates and the resulting products is reviewed for several different sausage types. In contrast to European varieties, American sausages have a lower pH and are dried (ripened) at a low temp. (12-15°C). European starter cultures reduce nitrate and usually produce low amounts of acid, while American starter cultures are selected solely for their ability to produce large amounts of acid and usually do not reduce nitrate. Thus, the lactic fermentation products and nitrate reductase activity of American and European sausages should be quite different. The results of studies on factors influencing the lactic fermentation and nitrate reductase activity in Lebanon bologna are presented and, where possible, compared with results for European sausages. AS

33

Growth inhibition of lactic acid bacteria. I. Dipeptides effective to the suppression of lactic rods and cocci and their application to beer and sake.
Munekata, M.
Bulletin of Brewing Science **19**, 27-34 (1973) [14 ref. En] [Res. Lab., Sapporo Breweries Ltd., Tokyo, Japan]

Growth inhibitory effects of oligopeptides (di-, tri and tetra-) against lactic rods and cocci were investigated. According to their physiological activities, dipeptides can be classified into 4 categories: growth-inhibitory, e.g. some alanyl dipeptides; reversers (non-toxic), e.g. glycyl-L-leucine, L-leucyl-glycine; reversers (toxic), e.g. L-

leucyl-L-tyrosine; and non-effective, e.g. some glycyl dipeptides. None of the component amino acids such as glycine, DL-alanine, DL-leucine, DL-threonine and DL-serine were inhibitory or reversing. This suggests that the essential competitive activity can be brought about only by dipeptides and not by individual amino acid components. AS

34

Stimulatory effect of malo-lactic fermentation on the growth rate of Leuconostoc oenos.
Pilone, G. J.; Kunkee, R. E.
Applied and Environmental Microbiology **32** (3) 405-408 (1976) [14 ref. En] [Dep. of Viticulture & Enology, Univ. of California, Davis, California 95616, USA]

Although L-malic acid is not an energy source for the malo-lactic organism L. oenos (L. citrovorum) ML 34, the growth rate of the organism was found to be greatly increased by malo-lactic fermentation (the decarboxylation of L-malic acid to L-lactic acid). The stimulation was especially striking at the low pH (below pH 4) of wine, the natural habitat of this bacterium. The stimulation of growth did not result from changes in pH that accompany malo-lactic fermentation. Thus, these results suggest a biological function of malo-lactic fermentation. AS

35

[Organoleptic changes in pear purees and their products caused by lactobacilli.]
Gherardi, S.; Carpi, G.; Vicini, E.
Industria Conserve **51** (1) 3-6 (1976) [2 ref. It, de, en, fr] [Sta. Sperimentale per l'Ind. delle Conserve Alimentari, Parma, Italy]

Chemical and organoleptic changes in canned pear purees were studied 24-120 h after inoculation with Lactobacillus casei and storage at 30°C, and also in jars of vacuum-packed baby foods prepared from frozen pear puree, sugar and ascorbic acid and stored at ambient temp. for 15, 30, 60 and 90 days. Results are tabulated. Lactobacilli were stabilized at about 10^8/g without producing significant chemical changes, although considerable sensory changes appeared 120 h after inoculation (browning, unpleasant flavour and aroma) in all samples. This deterioration was apparent in the GLC aromagram [FSTA (1973) 5 5H737]. The 120 sample and a commercial sample similarly altered showed an increase in all the head space volatiles, especially ethyl alcohol. Use of GLC for objective quality evaluation is suggested. RM

36

[Frozen concentrated lactic starters.]
Martins, J. F. P.
Boletim do Instituto de Tecnologia de Alimentos, Brazil No. 45, 1-17 (1976) [11 ref. Pt, en]

Advantages of using frozen concentrated starters in the dairy industry, the requirements to be satisfied by the starters, and the various stages in their production by continuous and batch methods are discussed. Starter concn. experiments made at the Food Technology Institute (ITAL), Sao Paulo, in which acceptable results were obtained using a Lactobacillus/Streptococcus cremoris culture inoculated at 0.1-1.0% in 10%-reconstituted skim-milk are described. The starter was concentrated by repeated centrifugation at 10 000 rev/min. During 6 h at 22°C, the concentrated starter inoculated at 0.1% produced almost as much acid as the original starter inoculated at 1.0%, and there were no differences in consistency or flavour of the resultant coagulum. The prospects for use of concentrated starter in Brazil are discussed. ADL

37

Effect of temperature on the growth and acid production of lactic acid bacteria. I. A rapid method for the estimation of bacterial populations in milk.
Kanasaki, M.; Breheny, S.; Hillier, A. J.; Jago, G. R.
Australian Journal of Dairy Technology **30** (4) 142-144 (1975) [3 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne, Parkville, Victoria, Australia]

In this rapid method, casein micelles are first solubilized in 5-ml portions of the culture at ice-cold temp. by addition of 10 ml 0.2% ethylenediaminetetra-acetate (EDTA) and 0.1 ml 10M NaOH; total bacterial population is then estimated by determining absorbance at 480 or 600 nm in a spectrophotometer. Comparison with dry wt. detn. using cultures of Streptococcus cremoris HP showed that the rapid method gave satisfactory results, but that samples which gave an absorbance of >1.000 should be diluted with milk prior to assay. [See also 2 following abstr.] CDP

38

Effect of temperature on the growth and acid production of lactic acid bacteria. II. The uncoupling of acid production from growth.
Breheny, S.; Kanasaki, M.; Hillier, A. J.; Jago, G. R.
Australian Journal of Dairy Technology **30** (4) 145-148 (1975) [7 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne, Parkville, Victoria, Australia]

The growth and acid production in milk of the bitter cheese starter organism Streptococcus cremoris strain HP and of the non-bitter organism Str. cremoris strain AM2 were studied at temp. commonly used in the manufacture of Cheddar cheese. The growth of both organisms was identical at 31.5°C but different at 37.5°C. After incubation for 2 h at 37.5°C, the rate of growth of strain HP was reduced, while acid production continued at a constant rate, but the growth of strain AM2 ceased while acid production continued at a reduced rate. At 35.5°C the rate of growth and acid production

of strain AM2 resembled that of strain HP at 37.5°C. Chloramphenicol completely inhibited growth but not acid production by strain AM2 at 31.5°C. A slow variant of Str. lactis strain C10 which does not grow in milk even at 31.5°C, because of a lack of available nitrogen, is capable of producing acid in milk. [See also preceding & following abstr.] AS

39

Effect of temperature on the growth and acid production of lactic acid bacteria. III. The influence of added growth supplement.
Hillier, A. J.; Kanasaki, M.; Jago, G. R.
Australian Journal of Dairy Technology 30 (4) 149-152 (1975) [8 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne, Parkville, Victoria, Australia]

When 0.5% tryptone was added to milk containing 0.5% yeast extract, growth of Streptococcus cremoris AM2 ceased abruptly after incubation for approx. 2 h at 37.5°C, but was slightly stimulated by the tryptone if incubated at 30°C. Presence of 1 or 2% yeast extract delayed heat inactivation of strain AM2 at 37.5°C, but addition of yeast extract to already inhibited cultures did not restore growth. Bitter strains of Str. cremoris grew well at 37.5°C and pH 6.3 in milk containing 1% yeast extract ± 0.5% tryptone, whereas growth of non-bitter strains was poor under these conditions. The rapid absorbance method [see part I] provided a simple means of identifying strains likely to produce high cell populations in the curd and hence bitterness in cheese. The uncoupling of acid production from growth is discussed as a possible means of controlling bacteriophage proliferation in the cheese vat, since phage were unable to replicate in non-growing cells which still retained a capacity to ferment lactose to lactic acid. [See also preceding 2 abstr.] CDP

40

Comparison of strains of Streptococcus cremoris for proteolytic activities associated with the cell wall.
Exterkate, F. A.
Netherlands Milk and Dairy Journal 30 (2) 95-105 (1976) [15 ref. En, nl] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

41

Quantitative relationship between micrococci and lactobacilli during ripening of fermented sausage and factors influencing this relationship.
Stolic, D. D.
Acta Veterinaria, Yugoslavia 25 (2) 91-104 (1975) [23 ref. En, sh] [Meat Tech. Dep., Yugoslav Inst. for Food Ind., Novi Sad, Yugoslavia]

Factors influencing the growth of lactobacilli and micrococci during ripening of 'Fruskogorska' sausage for approx. 20 days were studied. Variables studied were: inoculation with lactobacilli, micrococci or both; and use vs. non-use of the additive 'Tari S 70' (containing glucono-δ-lactone). Effects of additives on the growth of the selected strains of micrococci and lactobacilli were investigated in agar culture tests. Additives tested were: NaCl (1-5 g/100 ml agar); Tari S70 (0.6-1.0 g/100 ml); liquid smoke (0.03-0.6 ml/100 ml); and $NaNO_2$ (0.014-0.02 g/100 ml). Antagonism between the lactobacilli and micrococci was also studied. The results show that micrococci predominated at the start and lactobacilli at the end of ripening. A total of 178 strains of micrococci and 127 strains of lactobacilli were isolated. No antagonistic effects of micrococci on lactobacilli were observed; a slight antagonistic effect of lactobacilli against some strains of micrococci was observed. Of the additives tested, NaCl, $NaNO_2$ and liquid smoke had no effect on the bacteria studied; Tari S 70 inhibited both micrococci and lactobacilli, probably because of its effects on pH. Inoculation of the sausages with lactobacilli, micrococci or lactobacilli + micrococci had little effect on the development of the microflora. AJDW

42

[Lactobacillus control.]
Sapporo Breweries Ltd.
Japanese Patent 5 134 918 (1976) [Ja]

Contamination with Lactobacillus during brewing is prevented by the addition of alanine-terminated peptides. IFT

43

Preparation of Cottage cheese.
Sing, E. L.
United States Patent 3 968 256 (1976) [En]

It is claimed that the shelf life and flavour of Cottage cheese may be improved by adding to the cheese or the creaming mixture a concentrated cell preparation of Streptococcus diacetilactis in sufficient concn. to provide a cell concn. in the Cottage cheese ranging from 1.0×10^6/g to 2.0×10^8/g. Freeze-dried cultures, frozen concentrated cells or freeze-dried concentrated cells of Str. diacetilactis may be used. EJM

44

New milk product was begun in OSU laboratory.
Anon.
American Dairy Review 38 (9) 62, 64 (1976) [En]

Sweet acidophilus milk with an added strain of Lactobacillus acidophilus culture is now being marketed under different names in several cities in the USA. Frozen L. acidophilus concentrates, developed at the Oregon State University, can be stored over long periods and then added when convenient to fresh, cold, pasteurized milk. The milk can be kept under refrigeration for extended periods with no change in acidity and no significant loss in desirable organisms. A brief reference is

made to studies carried out in the USA which show that a lactobacillus organism (other than L. acidophilus) can colonize in the intestines of pigs, which is believed to be an important point because the intestinal tract of pigs has similarities to that of man. FL

45

The influence of metabolites and cell components of streptococci on the growth and proteolytic activity of Lactobacillus casei.
Libudzisz, Z.
Acta Alimentaria Polonica 2 (1/2) 87-100 (1976) [25 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiol., Politech., Lodz, Poland]

When incubated in culture medium that had previously been fermented by Streptococcus lactis 112 or Str. diacetilactis 239, growth of Lactobacillus casei WP-1 was min when the streptococci had been separated from the medium in the early stationary phase of growth; this medium had the lowest level of nutrients. If the streptococci-fermented medium was dialysed, thus removing about 60% of the amino N, lactobacilli subsequently grown in it had a very high proteolytic activity. Growth of lactobacilli in medium from which the streptococci had been removed in the late stationary phase of growth was similar to that of control cultures, and was enhanced by 20-30% when the medium was dialysed. Growth of L. casei was enhanced by 16-26% and 6-19% when the culture medium was supplemented with cell-free extracts from Str. diacetilactis and Str. lactis cultures respectively; proteolytic activity of the L. casei, particularly against whole- and α_s-casein, was reduced in these cultures. This decrease in proteolytic activity was not related to the growth phase of the streptococci used to prepare the extracts. [See also FSTA (1976) 8 9P1758.] CDP

46

Fortification of foods by fermentation with lysine-excreting mutants of lactobacilli.
Sands, D. C.; Hankin, L.
Journal of Agricultural and Food Chemistry 24 (6) 1104-1106 (1976) [12 ref. En] [Dep. of Plant Path. & Botany, Connecticut Agric. Exp. Sta., New Haven, Connecticut 06504, USA]

Most microorganisms regulate amino acid biosynthesis by mechanisms such as feedback inhibition and repression. Thus, they do not usually produce more amino acids than they need and in fact deplete those in the medium. However, some wild-type microorganisms and mutants do excrete specific amino acids. Some of these microorganisms are used to manufacture amino acids through fermentation procedures but none have been used directly to augment the amino acid content of food produced by fermentation. The authors used lysine analogues to select for spontaneous mutants of lactobacilli that over-produce and excrete lysine. Wild-type Lactobacillus acidophilus and L. bulgaricus and lysine-excreting mutants were used to ferment soybean milk to yoghurt. In all tests, mutants increased the lysine content of yoghurt over that obtained with the wild-type. Mutants of L. plantarum were used to increase the lysine content of corn silage. The potential use of lysine-excreting mutants in producing fermented foods is suggested. AS

47

[Oligopeptides (tri- and di-peptides) affecting growth of containing lactic acid bacteria in brewing.] [Review]
Munakata, M.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 71 (1) 16-20 (1976) [45 ref. Ja] [Sapporo Breweries Co. Ltd., Meguro-ku, Tokyo, Japan]

48

[Biological method for improving the quality of table wine.]
Trofimchenko, A. V.; Oreshkina, A. E.; Sarishvili, N. G.
Vinodelie i Vinogradarstvo SSSR No. 6, 14-18 (1976) [1 ref. Ru] [Upravlenie Vinodel'cheskoi Promyshlennosti Minpishcheproma SSSR, USSR]

A continuous method for biological reduction of the oxygen content and for control of the oxidation-reduction processes during the manufacture of tables wine was developed. The method, based on the complex action of the yeast culture and lactic acid bacteria, involves use of a thin layer of highly concn. microflora in vessels containing material such as polyethylene or porcelain to increase the active area of contact between the wine and the microflora. The reaction temp. was the major means of controlling the biological processes. The treatment generally produced a reduction in titratable acidity of 1.5-2%. Traces of malic acid should be retained in the wine because of its importance organoleptically. Physical and chemical changes in the wine as a result of the recommended treatment are presented. STI

49

Bacterial spoilage of citrus products at pH lower than 3.5.
Juven, B. J.
Journal of Milk and Food Technology 39 (12) 819-822 (1976) [17 ref. En] [Inst. for Tech. & Storage of Agric. Products, Volcani Cent., Bet Dagan, Israel]

A strain of Lactobacillus brevis, L-3, was isolated from a blown can of grapefruit segments in sugar syrup; it caused spoilage of citrus products having pH values <3.5. When inoculated into orange (pH 3.38) and grapefruit (pH 2.99) juices, after 5 h at 30° C L-3 produced 15 and 22 µg diacetyl/ml, respectively, and off-flavour was detectable. L-3 grew in APT broth acidified to pH 3.0 with citric, hydrochloric, phosphoric or tartaric acid. However, its growth was inhibited at pH 3.6 if the acidulant was lactic acid, while with acetic acid inhibition

occurred at a pH between 3.7 and 4.0. The thermal resistance of L-3 in organge serum (pH 3.4) was studied in the temp. range 52-60° C; a z value of 8.3 was obtained. A simple and reliable capillary technique for studying the thermal resistance of gas-producing organisms in liquid foods and media is presented. AS

50

[Processing of olives with starter cultures.]
Herstellung von Speise-Oliven mit Starterkulturen. [Review]
Liepe, H.-U.; Pfeil, E.
***Industrielle Obst- und Gemueseverwertung* 61** (17) 449-453 (1976) [80 ref. De]

The fermentation process for production of pickled olives is described and the results of chemical and microbiological examination of several commercial samples are presented; these confirm that the desired reduction in pH is not always achieved due to insufficient growth of lactic acid bacteria. The growth of desirable strains of bacteria is hindered by: the preliminary alkali treatment to remove the bitter principle of olives (oleuropein); the presence of breakdown products of oleuropein; the salt content of the brine; and the absence of sufficient amounts of sugar in the substrate. A special salt- and alkali-tolerant strain of lactobacilli was developed and inoculated at a rate of 1.0×10^7 organisms/ml of pickling solution, coupled with the addition of 0.5-1.0% sugar. Laboratory tests showed that the lactic acid concn. could reach 0.9-1.0% and in practical experiments a lactic acid concn. of 0.94% was reached in 21 days in an inoculated pickling bath, compared with only 0.40% in non-inoculated controls. There was only a marginal difference in pH between inoculated and non-inoculated samples at the end of the fermentation period. BDH

51

[Tyramine content of miso.]
Takagi, H.; Okamoto, R.
***Journal of the Japanese Society of Food and Nutrition [Eiyo to Shokuryo]* 28** (7) 363-370 (1975) [15 ref. Ja, en] [Lab. of Food & Food Health, Nat. Inst. of Agric., Kita-ku, Tokyo, Japan]

Koji was prepared by inoculating steam sterilized rice with Aspergillus oryzae and miso was prepared by inoculating mixtures of the koji and boiled soybeans with Asp. oryzae or lactic acid bacteria. Samples of the koji and miso were analysed for tyramine. Samples prepared by inoculation with Asp. oryzae contained no tyramine, while those prepared by inoculation with lactic acid bacteria contained approx. 3 mg% of tyramine. Higher tyramine contents were found in miso fortified with calcium carbonate. Tyramine formation in miso decreased with increasing NaCl content. In miso with a low NaCl content, addition of glucose and calcium carbonate produced a large increase in the tyramine content. [From En summ.] [See also FSTA (1976) 8 7J1072.] JA

52

[Experimental results of concentration of a mesophilic lactic starter cultivated in skim-milk.]
Martins, J. F. P.
Boletim do Instituto de Tecnologia de Alimentos, Brazil No. 46, 57-66 (1976) [10 ref. Pt, en]

Initial results are reported of various experiments on concn. of Streptococcus cremoris/Leuconostoc cremoris starter (Christian Hansen Laboratorium A/S) which was inoculated at 2% into reconstituted skim-milk and incubated at 22° C to 70-75° D acidity (about 15 h). The efficiency of centrifugation (30 min at 3500-15 000 × g and 5° C) was calculated by inoculating the supernatant at 1 × and 10% in skim-milk and incubating at 30° C. Suspension of the biomass at 1.6% of the original vol. gave satisfactory results. The activity of the conc. starter (compared with 1% normal starter) was determined by measuring the acidification of milk during 6 h incubation at 22° and 30° C, using different concn. of starter (0.1, 0.5 and 1.0%). At 0.1% the conc. starter was slightly more active at 22° C and slightly less active at 30° C than 1% normal starter. At 0.5 and 1% the concentrated starter gave very high levels of acidification (up to 79.1° D with 1% starter at 30° C), suggesting potential uses for rapid cheese ripening or as mother culture. It is pointed out that there is little loss in activity if the starter is frozen with liquid N, and that starter concn. up to 180-240 × are feasible (vs. a concn. of only 60 × in the experiments described). ADL

53

Effect of cryoprotective agents on freeze-drying and storage of lactic cultures.
Kilara, A.; Shahani, K. M.; Das, N. K.
Cultured Dairy Products Journal 11 (2) 8-11 (1976) [8 ref. En] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska 68583, USA]

4 lactic acid bacteria differed considerably in their survival in the presence of 12 cryoprotective agents during rapid freezing, freeze-drying and storage at 4° C, and the survival % after freezing did not appear to be indicative of the survival after freeze-drying or storage. The best cryoprotective agents for freeze-drying and storage were as follows (% survival after 48 wk storage in parentheses): L. bulgaricus, casitone (15%); L. acidophilus, monosodium glutamate (36%) and milk solids (20%); Str. thermophilus, malt extract (30%), Myvacet (Distillation Products Inc., 19%) and pectin (10%); and Str. lactis, malt extract (22%), glycerol (18%), peptonized milk and milk solids (15% each). Using the most effective agents, it was shown that survival % during freezing and freeze-drying was directly related to bacterial load. 42-45, 51 and 78% of the acid-producing ability of the lactobacilli, Str. thermophilus and Str. lactis, respectively, was retained after freeze-drying and storage for 24 wk. CDP

54

Natural antibiotic activity of Lactobacillus acidophilus and bulgaricus.
Shahani, K. M.; Vakil, J. R.; Kilara, A.
Cultured Dairy Products Journal **11** (4) 14-17 (1976) [14 ref. En] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska 68583, USA]

13 strains of Lactobacillus acidophilus and 3 of L. bulgaricus, all stock cultures maintained at the University of Nebraska, were used in these studies investigating their inhibitory activity towards other bacteria, effects of incubation temp. on the production of antibacterial activity and the production of inhibitory components by L. acidophilus in different media. FL

55

Phage resistant mutants: their selection and use in cheese factories.
Limsowtin, G. K. Y.; Terzaghi, B. E.
New Zealand Journal of Dairy Science and Technology **11** (4) 251-256 (1976) [18 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Mutants (designated 134, 398 and 402) from 3 strains of Streptococcus cremoris (AM_2, E_8 and 158 respectively) were each selected for resistance to a specific phage and for suitable acid production. These were then released to commercial factories in New Zealand during the 1975/76 cheesemaking season, where they were used in rotations, each paired with another single strain. Analysis of wheys from 20 cheese factories using 1 or more of these mutants revealed phages in 6 factories. 2 phages differing in head morphology both grew mutants 402 and 398 and 2 other morphologically distinct phages which had mutant 402 as part of their host range were also detected. All these phages could be differentiated from the original phages. No phage for mutant 134 was found. AS

56

Commercial casein as a source of edible sialic acid and a growth promoting factor for Lactobacillus bifidus variant pennsylvanicus.
Kehagias, C. H.
Dissertation Abstracts International, B **37** (2) 679: Order No. 76-17994 (1976) [En] [Ohio State Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

A method developed for isolation of pure sialic acid and a casein bifidus factor (CBF) from casein is described; CBF stimulates the growth of L. bifidus. The method involves hydrolysis of 1 part casein with 10 parts 0.18 N H_2SO_4 at pH 1.5 and 80° C for 60 min. Liberated sialic acid and CBF are separated from the hydrolysate by ion exchange chromatography. Removal of sialic acid and CBF from casein produced a casein which exhibited electrophoretic patterns, solubility properties and viscous characteristics similar to those of intact casein. Rennet sensitivity studies indicated that the sialic acid-free casein contained the rennet-sensitive bond intact. The Ca sensitivity of the modified casein was somewhat higher than that of intact casein. For most food applications, it is expected that modified casein would be comparable to intact casein. JA

57

Aldolases of the lactic acid bacteria. Demonstration of immunological relationships among eight genera of Gram positive bacteria using an anti-pediococcal aldolase serum.
London, J.; Chace, N. M.
Archives of Microbiology **110** (1) 121-128 (1976) [14 ref. En] [Lab. of Microbiol & Immunology, Nat. Inst. of Dental Res., Bethesda, Maryland 20014, USA]

58

[Degradation of sorbic acid by bacteria.] [Lecture]
Radler, F.
Bulletin de l'O.I.V. **49** (545/546) 629-635 (1976) [7 ref. Fr] [Inst. de Microbiol. & de Recherches sur le Vin, Univ. Johannes Gutenberg, Mainz, Federal Republic of Germany]

This lecture, presented at the meeting reported in the preceding abstr., first reviews recent studies of the effects of adding sorbic acid to wine [e.g. FSTA (1976) **8** 2H251 & 8H1391] with particular reference to its role in producing a 'geranium' odour. The author then reports on studies which examined the effect of sorbic acid on various homofermentative and heterofermentative lactic acid bacteria, consideration being given to their ability to produce hexanedienol (a precursor of the geranium odour) from sorbic acid. JA

59

[Mutual effects of sorbic acid and sulphurous acid.]
Über die gegenseitige Beeinflussung von Sorbinsäure und schwefliger Säure.
Heintze, K.
Industrielle Obst- und Gemueseverwertung **61** (20) 555-556 (1976) [6 ref. De] [Inst. für Lebensmittelchemie, Bundesforschungsanstalt für Ernährung, Karlsruhe, Federal Republic of Germany]

Solutions containing sorbic acid (200 mg/l.) either alone or with SO_2 (100 mg/l., as sodium metabisulphite) were stored at room temp. under N_2 and pH 3.5 for periods of 65-100 days, and the changes in sorbic acid and sulphite concn. with time were determined in order to establish whether any reaction occurred between the 2 substances. Although sorbic acid alone was relatively stable under these conditions, there was a rapid fall in its concn. in the presence of SO_2, to a level of approx. 50 mg/l. The amount of free SO_2 was also reduced by about 62% of the original value, although the total sulphite content determined by the method of

Reith & Willems [Zeitschrift für Lebensmittel-Untersuchung und -Forschung (1962) **108**, 270] remained unchanged. It is inferred that a 1:1 addition product is formed between sorbic acid and SO_2 under these conditions, which reduces the amount of available SO_2. The possible consequences of such a reaction under practical conditions, e.g. in wine making, are discussed. It is suggested that consequent multiplication of lactic acid bacteria and reduction of sorbic acid of hexa-2,4-dien-1-ol may be associated with the occurrence of a 'geranium' note in the final product. BDH

60

[Comparative study on media for detection of lactic acid bacteria in breweries.]
Meyling, J. C.
Voedingsmiddelentechnologie **9** (33/34) 10-12 (1976) [10 ref. Nl, en]

Comparative studies on the suitability of (i) WL Nutrient Agar, (ii) Universal beer agar, (iii) de Man, Rogosa & Sharp agar, (iv) Micro Assay Culture Agar, (v) Tomato Juice Agar, (vi) Lee's Multi Differential Agar and (vii) Raka Ray agar, for detection of beer spoilage lactic acid bacteria in breweries are described. Tests were conducted with 3 brewery Pediococcus strains, 1 brewery Lactobacillus strain, 4 reference Lactobacillus strains and 1 reference Pediococcus strain. Tables of results are given showing recovery, colony diam., and effects of addition of 20 ppm actidione + 3000 ppm 2-phenylethanol to the medium. A study was also conducted under practical process control conditions. Media (iii) and (vii) were satisfactory; of these, (vii) gave the better results, and is therefore recommended. AJDW

61

[Changes in the protein complex of milk caused by Lactobacillus acidophilus.]
Mitic, S.; Cuperlovic, M.
Mljekarstvo **26** (10) 232-236 (1976) [5 ref. Sh] [Inst. za Mlekarstvo, Belgrade, Yugoslavia]

(i) reconstituted sterile dried skim-milk was inoculated with L. acidophilus, incubated for 24 h at 37° C, and the resultant (ii) acidophilus milk was stored at 4° C. (i) and (ii) were acid-hydrolysed and constituent amino acids were determined using a Spinco-Beckman model 125 B automatic analyser. Tabulated values for 18 amino acids do not show marked differences between (i) and (ii). The proteins of (i) and (ii) were fractionated on Sephadex G-100 gel directly or after dialysis for 48 h against phosphate buffer. The results of fractionation are shown graphically. Proportions of 3 main fractions as % of total protein were: before dialysis, (i) 68.0, 13.9 and 18.1, and (ii) 39.5, 15.5 and 45.0; after dialysis, (i) 90.5, 9.5 and 0 and (ii) 95.5, 4.5 and 0. It is concluded that the main changes in (ii) were in protein pattern, the findings indicating degradation of the calcium caseinate complex. SKK

62

[Species composition of lactic acid bacteria in tvorog whey.]
Levon, A. V.; Slyusarenko, T. P.
Pishchevaya Promyshlennost' Respublikanskii Mezhvedomstvennyi Nauchno-tekhnicheskii Sbornik No. 21, 90-93 (1975) [10 ref. Ru]

145 [?155] strains of lactic acid bacteria isolated from 55 samples of tvorog whey obtained from 6 dairy factories in Kiev region were identified by customary classification schemes [see e.g. Rogosa & Sharpe, Journal of Applied Bacteriology (1959) 22 (3) 329] as follows: 40 strains of Streptococcus lactis, 9 of Str. lactis subsp. diacetilactis, 17 of Str. cremoris, 22 of Str. faecalis, 12 of Str. faecalis subsp. liquefaciens, 10 of Str. thermophilus, 3 of Leuconostoc lactis, 5 of Lactobacillus helveticus, 5 of Lact. plantarum, 5 of Lact. casei, and 18 of Lact. brevis. SKK

63

[Role of various enzymes of lactic acid bacteria in cheese ripening.]
Umemoto, Y.; Ohmiya, K.; Sato, Y.
Japanese Journal of Dairy and Food Science [Rakuno Kagaku Shokuhin no Kenkyu] 25 (6) A177-A184 (1976) [39 ref. Ja] [Fac. of Agric., Nagoya Univ., Nagoya, Japan]

64

[Method for selection of lactic acid bacteria for cheesemaking.]
Umanskii, M. S.; Borovkova, Yu. A.; Klimovskii, I. I. **Union of Soviet Socialist Republics**, Altaiskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti; **Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti
USSR Patent 531 527 (1976) [Ru]

Test microorganisms were cultivated in nutrient medium at optimum growth temp. for 5-6 days and their lipolytic activity determined from the amount of fatty acids formed. In order to provide conditions identical to those during cheese maturation, the microorganisms were cultivated in sterile milk with 0.2-0.25% rennet, with subsequent extraction of lipid fractions and separation of fatty acids from these by TLC, the quantity of fatty acids being determined by photodensitometry. W&Co

65

[Changes in numbers of somatic cells in cows' milk in relation to changes in numbers of indigenous microflora and Streptococcus agalactiae.]
Zajac, M.; Piotrowska, E.; Bidwell, K.; Janota-Bassalik, L.
Roczniki Instytutu Przemyslu Mleczarskiego **18** (1) 19-34 (1976) [14 ref. Pl, ru, en] [Inst. Genetyki i Hodowli Zwierzat PAN, Jastrzebiec, Poland]

66

[Changes in casein fraction contents in cows' milk against the background of quantitative changes in the natural microflora of the udder and after experimental introduction of Streptococcus agalactiae.]

Zajac, M.; Janota-Bassalik, L.

Roczniki Instytutu Przemyslu Mleczarskiego **18** (2) 67-73 (1976) [20 ref. Pl, ru, en] [Inst. Genetyki i Hodowli Zwierzat PAN, Jastrzebiec, Poland]

Quarter milk samples were obtained from 4 cows during the 3 consecutive days before experimental infection with Str. agalactiae, during the 4 consecutive days after infection, and 1, 3, 6 and 8 wk later. Contents of β-, α_{s1}- and κ-casein in the samples were determined by starch gel electrophoresis. It is concluded from tabulated and graphically presented results that contents of β-casein decreased slightly and those of α_{s1}- casein increased slightly in quarters in which Str. agalactiae was causing subclinical mastitis; but, in general, extent of changes in fraction proportions depended more on individual traits of the cows than on effects of Str. agalactiae. SKK

67

Recent developments in yoghurt starters. II. A note on the suppression of Lactobacillus bulgaricus in media containing β-glycerophosphate and application of such media to selective isolation of Streptococcus thermophilus from yoghurt. [Lecture]

Shankar, P. A.; Davies, F. L.

Journal of the Society of Dairy Technology **30** (1) 28-30 (1977) [6 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

A medium devised primarily for lactic streptococci and their phages but also recommended for Lactobacillus bulgaricus was found to be inhibitory to many strains of L. bulgaricus. The inhibition was attributed to the buffering agent, β-glycerophosphate, in the medium and could also be demonstrated when this buffer was incorporated in other media. Since the glycerophosphate-containing medium supported good growth of Streptococcus thermophilus it was applied successfully to selectively isolate this organism from yoghurt. [See FSTA (1977) **9** 6P893.] AS

68

Recent developments in yoghurt starters. III. Associative bacterial growth in yoghurt starters; initial observations on stimulatory factors. [Lecture]

Shankar, P. A.; Davies, F. L.

Journal of the Society of Dairy Technology **30** (1) 31-32 (1977) [8 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Heat treatment (up to 108° C for 10 min) of milk used to culture yoghurt starters had no observable effect on growth of Streptococcus thermophilus but stimulated that of Lactobacillus bulgaricus, the effect increasing with severity of heat treatment. The stimulation only occurred in mixed cultures. The possibility that heat treatment of milk induces Str. thermophilus to produce a stimulant (such as formic acid) for L. bulgaricus is discussed. [See FSTA (1977) **9** 6P893.] MEG

69

[Preparation, characteristics and use of dried concentrates of lactic acid bacteria biomass.]

Kornacki, K.

Zeszyty Naukowe Akademii Rolniczo-Technicznej w Olsztynie No.155 (Technologia Zywnosci) 3-52 (1976) [76 ref. Pl, ru, en] [Inst. Inzynierii i Biotech. Zywnosci, ART, Olsztyn, Poland]

This detailed report covers numerous experiments on selection of lactic acid bacteria and nutrient media suitable for preparation of dried biomass intended for use as commercial cheese starters, and results of tests with dried concentrates in Edam cheese production. The utilization of fermentation liquors for production of propionic acid and protein by microbial synthesis is discussed. A proposed industrial line for dried concentrate preparation is diagrammatically illustrated. SKK

70

The influence of intestinal (ceca) flora on serum and egg yolk cholesterol levels in laying hens.

Tortuero, F.; Brenes, A.; Rioperez, J.

Poultry Science **54** (6) 1935-1938 (1975) [14 ref. En] [Inst. de Alimentacion y Productividad Anim., CSIC-Ciudad Univ., Madrid-3, Spain]

(i) Normal and (ii) caecectomized laying hens were used to study the influence of intestinal (caeca) flora and the implantation of Lactobacillus acidophilus on the levels of serum and egg yolk cholesterol. The caeca had been surgically removed when the experimental birds were 16 months of age. Serum cholesterol levels of (ii) were higher than those of (i); the Lactobacillus acidophilus implantation resulted in a significant decrease in serum cholesterol levels in both groups. The normal intestinal (caeca) flora and Lactobacillus acidophilus implantation did not influence fat digestibility. Egg yolk cholesterol levels were higher for (ii). A constant relationship between serum and egg yolk cholesterol was not observed. AS

71

The influence of added pure cultures on the coliforms and organoleptical qualities of ground meat. [Lecture]

Dimitrova, N.; Brankova, R.

Proceedings of the European Meeting of Meat Research Workers No. 22, L8:1-L8:6 (1976) [5 ref. En, fr, de, ru] [Meat Tech. Res. Inst., Sofia, Bulgaria]

Effects of added Lactobacillus plantarum culture on the bacteriological quality and organoleptic

properties of a 60:40 ground pork/beef blend (containing 2% added NaCl) were studied. 5 treatments were studied: (i) added L. plantarum only; (ii) L. plantarum + 0.1% glucose; (iii) L. plantarum + 0.2% sucrose; (iv) L. plantarum + 0.05% glucose + 0.15% sucrose; and (v) control (no added L. plantarum or sugar). (i)-(iv) contained L. plantarum at an initial count of approx. 10^8/g. The anaerobic count, lactic acid bacteria count, coliform count, pH, flavour, taste, juiciness and overall organoleptic quality were determined after holding for 0, 4 or 8 days at 4° C. Graphs of results are given. The results show that treatments (i)-(iv) do not significantly influence changes in counts of anaerobic organisms or coliforms during storage, or the pH of the product. Organoleptic properties of variants were approx. equal for the first 4 days of storage; the quality of batches treated with (i), (ii), (iii) or (iv) then declined slightly, whereas that of batch (v) declined considerably. It is therefore concluded that addition of L. plantarum culture significantly improves quality retention during storage. [See FSTA (1977) 9 6S988.] AJDW

72

[Study of ripening of soft-consistency raw-smoked sausages using a bacterial preparation and glucono-delta-lactone. I.] [Lecture]
Krylova, V. V.; Likhonosova, N. D.; Mikhailova, M. M.; Mirzoeva, V. Sh.; Marushkina, V. I.; Anisimova, I. G.; Chistyakova, T. G.
Proceedings of the European Meeting of Meat Research Workers No. 22, G4:1-G4:6 (1976) [Ru, en, fr, de] [Vses. Nauchno-issled. Inst. Myasnoi Promyshlennosti, Moscow, USSR]

Bacterial preparation VNIIMP-2 of the authors' Institute consisting of a 2:1 freeze-dried mixture of lactobacilli and a denitrifying Micrococcus (BP) or gluconolactone (Pfeizer, USA) (GL) were added to sausage meat at 10 million bacterial cells/g or 0.5% respectively. Data on pH, contents of lactic acid and volatile fatty acids, titratable acidity and organoleptic evaluation (colour, aroma, consistency, taste) are tabulated for control, BP, and GL sausages after 17 and 30 days of ripening (drying). BP addition resulted in more marked decrease in pH in comparison with control than addition of GL, and caused greater accumulation at the end of ripening of lactic acid and titratable acidity. It is concluded that BP had a beneficial effect on quality and hygiene quality of sausage through promotion of lactic acid fermentation. Casing diam. had no noticeable effect. [See FSTA (1977) 9 6S988.] SKK

73

[Formation of 2-butanol by lactic acid bacteria isolated from wine.]
Bertrand, A.; Suzuta, K.
Connaissance de la Vigne et du Vin 10 (4) 409-426 (1976) [17 ref. Fr, en, de, es, it] [Inst. d'Oenologie, Univ. de Bordeaux II, 351 Cours de la Liberation, 33405 Talence, France]

The presence of 2-butanol is a characteristic of poor quality brandies. Its origin was studied by culturing 80 strains of lactic acid bacteria on synthetic media (modified Carr); 3 strains of Lactobacillus brevis were selected for their capacity to form 2-butanol from 2,3-butanediol. In cultures containing varying amounts of glucose and 2,3-butanediol, and at different pH, 2-butanol concn. of $\leqslant$528 mg/l. were obtained. Analysis was effected by direct injection in a 'Varian 1200' chromatograph with flame ionization detector. The 2-butanol detected in brandies probably results from lactic acid bacteria activity in wine lees before distillation. VC

74

Margarine emulsions.
Unilever Ltd.
British Patent 1 455 410 (1976) [En]

The build-up of aldehyde off-flavours in aqueous fat emulsions containing large proportions of triglycerides of unsaturated fatty acids is reduced by the incorporation of lactobacillaceae. IFT

75

[Process for controlling the biological activity of copper in industrial cultures of micro-organisms, particularly of lactic yeasts.]
Joux, J.-L. F. Fromageries Bel-la Vache qui Rit
French Patent Application 2 292 233 (1976) [Fr]

The concn. of biologically active Cu in a medium for use in culturing microorganisms, such as lactic yeasts, is controlled by adding an appreciable amount of Cu at a concn. higher than strictly necessary and at the same time buffering the Cu with a complexing agent for the cupric ion, such as EDTA, citric acid or tartaric acid. The complexing power is increased in the medium by heating the reducing sugars or protein compounds present or added. W&Co

76

Purification and characterization of the agglutinating factor for lactic streptococci from bovine milk: IgM-immunoglobulin.
Kanno, C.; Emmons, D. B.; Harwalkar, V. R.; Elliott, J. A.
Journal of Dairy Science 59 (12) 2036-2045 (1976) [36 ref. En] [Food Res. Inst., Agric. Canada, Res. Branch, Ottawa, Ontario K1A OC6, Canada]

77

The effect of UV-rays on the proteolytic activity of Streptococcus diacetilactis.
Piatkiewicz, A.
Acta Alimentaria Polonica 2 (1/2) 73-85 (1976) [16 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiol., Politech., Lodz, Poland]

Cells of Str. diacetilactis 239 that had been washed twice and resuspended in 0.2M phosphate buffer pH 6.5 to give approx. 10^9 cells/ml were

exposed for 15-150 s to UV irradiation from a Philips bulb under standard conditions. For a given biomass density (1 mg/ml), resistance to UV rays decreased with age of the culture, cultures in the log phase of growth having the greatest resistance. UV treatment resulted in mutants with increased proteolytic activity towards casein; after 60 and 90 s irradiation, respectively, 36% of 25 and 24% of 29 isolates had activity of >8 (expressed as mg N-NH_2/100 ml milk) whereas 39.2% of isolates of the parent strain had activity of 2-4 and none had activity of >8. No correlation was found between acidifying, proteolytic and aroma-forming properties before and after irradiation; however, good acidifying activity was never accompanied by weak proteolytic activity. CDP

78

[Sensitivity of different species of lactic streptococci to bacteriophages common in some Lithuanian SSR cheese factories.]
Berzhyunas, Z.; Sukhotskene, I.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti 10, 231-235 (1976) [9 ref. Ru, li, en] [Litovskii Filial VNIIMiSP, Kaunas, USSR]

82 strains of lactic streptococci including 31 strains of Str. lactis, 23 of Str. cremoris, 20 of Str. diacetilactis, and 8 of Str. paracitrovorus from the collection of the All-Union Butter and Cheese Industry Research Institute (VNIIMS) in Uglich were tested for bacteriophage sensitivity by methods described in FSTA (1974) 6 12P1836. Of the 82 strains, 27 were found sensitive in the Prekule cheese factory, 13 in the Rokishkis factory, and 2 in the Kedainyai factory. Data for the experimental factory of the Kaunas Institute are presented in the abstract quoted above. Sensitivity decreased in the order Str. diacetilactis (60%) > Str. cremoris (52.3%) > Str. lactis (45.2%) > Str. paracitrovorus (12.5%). Raw milk was the main source of bacteriophages, but they were also obtained in a number of cases from pasteurized milk; whey was a good medium for bacteriophage dissemination in the factories. SKK

79

[Preparation of concentrated cultures of lactic acid bacteria and their use in the dairy industry.]
Kornacki, K.; Rymaszewski, J.; Poznanski, S.
Roczniki Instytutu Przemyslu Mleczarskiego 18 (1) 17 (1976) [44 ref. Pl, ru, en] [Inst. Inzynierii i Biotech. Zywnosci, ART, Olsztyn, Poland]

This review includes the description of a process (diagrammatically illustrated) designed in the authors' Institute for commercial production of dried concentrates of lactic acid bacteria. A 36% HCl solution is added under constant stirring to skim-milk until a pH of 3.0-3.5 is attained; a pepsin preparation is then added, the mixture is incubated at 40° C for 18 h, is heated to 90° C to precipitate unhydrolysed protein and inactivate pepsin, and cooled; the pH is brought to 6.65, and the mixture is filtered; to the whey enriched by the soluble nitrogenous products of hydrolysis, yeast extract or an aqueous decoction of maize and Mg, Mn and Zn salts are added; the supplemented whey is sterilized for 15 min at 0.6 atm gauge pressure, cooled to 30° C and inoculated with pure cultures of the desired lactic acid bacteria; during biomass growth, a constant pH is maintained; at the end of the growth phase, the culture is cooled to 10° C, bactofugated, and the concentrate is either freeze-dried, or spray-dried after addition of milk protein concentrate or dried skim-milk as carrier. SKK

80

[Acid-producing properties of thermophilic lactic bacteria in relation to yoghurt manufacture.]
Accolas, J. P.; Bloquel, R.; Didienne, R.; Regnier, J.
Lait 57 (561/562) 1-23 (1977) [47 ref. Fr, en] [Lab. de Tech. Laitiere, INRA, 78350 Jouy-en-Josas, France]

Study of the acid-producing properties of different strains of Streptococcus thermophilus and Lactobacillus bulgaricus in pure and mixed cultures revealed considerable differences between strains as regards the effect of temp. (35-50° C) on their acid production in milk. Mixed cultures always produced more acid than the corresponding pure cultures. A mixed culture of Str. thermophilus 160 and L. bulgaricus 369, tested by successive re-inoculations after incubation for varying periods at 44° C, showed a pronounced tendency to develop a balance between the 2 species even if one species was dominant initially. The speed with which this mixed culture was cooled (for storage) had little effect on its acid production, whereas in the case of certain other mixed cultures much less acid was produced during storage (at 14° and 8° C) after rapid cooling than after slow cooling. Most mixed cultures showed considerable acid production during storage at 14° C, and some cultures even at 8° C, but cultures which were rapidly cooled and stored at 0° C or -30° C produced little or no acid. The results are discussed from the point of view of selection of cultures for yoghurt production: it is pointed out, for example, that storage of yoghurt at about 0° C to prevent increases in acidity would be costly, while cooling of yoghurt at a low degree of acidity (in anticipation of a rise in acidity during storage) might entail risks of insufficient acidification. ADL

81

Effect of fruit on growth of Lactobacillus bulgaricus and Streptococcus thermophilus.
Thornhill, P.; Cogan, T. M.
Journal of Dairy Research 44 (1) 155-158 (1977) [11 ref. En] [Moorepark Res. Cent., Agric. Inst., Fermoy, Co. Cork, Irish Republic]

The effect of different fruit purees on the growth of Str. thermophilus and L. bulgaricus strains

isolated from 2 commercial yoghurt cultures was studied. When 5% fruit was added, growth of all strains was stimulated although in the case of Str. thermophilus Y2 and HA strains stimulation was slight. In general, increasing the concn. to 10% resulted in only a small additional increase in stimulation; 1% puree had little or no effect on growth. The effects of different fruit sera on acid production by the different strains and by selected pairs of cultures in skim-milk as a function of time was also studied. In all cases stimulation was not evident until the culture had been incubated for 2-3 h. However marked stimulation of growth of the mixture of strains occurred in the absence of fruit; the additional stimulatory effect of fruit not being as great as one would predict from the effect on the individual strains. It is unlikely therefore that fruit plays a major role in growth stimulation in set-type yoghurt and that components responsible for symbiosis between Str. thermophilus and L. bulgaricus were more important than fruit puree in determining the extent of growth. LMB

82

[Ability of some lactic acid bacteria to transform aspartate and glutamate.]
Zvyagintsev, V. I.; Zemlyanukhin, A. A.; Makeev, A. M.; Nikol'skaya, G. V.; Tsvetkova, N. D.
Mikrobiologiya 45 (3) 425-428 (1976) [8 ref. Ru] [Kemorovskii Tekh. Inst. Pishchevoi Promyshlennosti, USSR]

In order to choose lactic acid bacteria with suitable organoleptic properties for production of cheese, differences in transformations of labelled [4-^{14}C]aspartic acid and [5-^{14}C]glutamic acid by several strains of Streptococcus acetoinicus were determined. It appeared that the strains producing cheese with excellent organoleptic properties were also very active in biosynthesizing dicarboxylic and tricarboxylic as well as keto-acids. STI

83

Addition of whey to a multiple strain starter culture for casein making.
Thomas, T. D.; Heap, H. A.; Lawrence, R. C.
New Zealand Journal of Dairy Science and Technology 12 (1) 1-4 (1977) [8 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

A multiple starter containing 32 isolates of Streptococcus cremoris was used in commercial lactic casein making. Satisfactory performance required either weekly culture replacement from deep-frozen stocks or the regular addition of filtered whey, from previous manufacture, to the mother culture. AS

84

[Changes in yoghurt characteristics during freeze-drying and storage. I. Viability of lactic acid bacteria during yoghurt freeze-drying.]
Karadimov, D. S.; Murgov, I. D.; Karadimova, Z. A.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 22 (1) 41-49 (1975) [6 ref. Bg, en, ru] [Katedra po Protsesi i Aparati, VIpKhiVP, Plovdiv, Bulgaria]

Yoghurt was made from whole milk or skim-milk using production starters supplied by the central laboratory of DSO 'Serdika' in Sofia (Bulgaria). Culturing was at 37° or 45° C. Yoghurts of 70°, 85° or 100° T (titratable acidity) were freeze-dried (fluidized bed) at -30° C initially, from -8° to -12° C during removal of moisture and at 30°, 35° or 40° C final temp. Freeze-dried samples were stored at 4-6° C or at 18-25° C packaged either in polyethylene/Al foil bags or in dark glass or clear glass jars. Viability of Streptococcus thermophilus and Lactobacillus bulgaricus was determined initially and after storage for 1.5 months. The ratio of the 2 starter components was 5:1 in yoghurt before drying and 100:1 after drying and storage. It is concluded from results presented for the different experimental variants that optimal conditions for survival of starter components were: freeze-drying at final temp. of 30° C of yoghurt cultured at 37° C and with 70° T, and storage of the product at 4-6° C in polyethylene/Al foil. Under these conditions, a viability of ⩽86.3% was achieved after storage. SKK

85

[Starter concentrates produced by continuous and batch culture.]
Krasnikova, L. V.; Belova, G. A.; Silant'eva, L. A.; Medvedeva, Z. P.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 63-66 (1976) [10 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, USSR]

Continuous, 2-stage cultivation of a mixture of mesophilic lactic streptococci is described; it is based on the existing cultivating techniques (incubation, centrifugal separation, freeze-drying). The bacteria were cultured in reconstituted fermented skim-milk with glucose, yeast autolysate, sodium citrate and manganese sulphate additions. With active strains the highest numbers of active bacterial cells accumulated after 12-15 h incubation; whereas with less active strains the period was 21-24 h. Characteristics of the dried bacterial concentrates (total number of bacteria, number of aroma-producing bacteria, acidity, duration of culturing) are given. The method of continuous culturing produces a satisfactory starter bacteria concentrate. STI

86

[Changes in colony forms of lactic streptococci.]
Bannikova, L. A.; Zadoyana, S. B.
Molochnaya Promyshlennost' No. 1, 17-19 (1977) [7 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

4 strains (629, 125_7, 330_9 and 553_1) of Streptococcus lactis from the commercial collection of VNIMI (the All-Union Dairy Industry Research Institute) were grown on 2 solid media, hydrolysed

milk agar or hydrolysed milk agar with 2% $CaCO_3$ and 2 ml 1.6% alcoholic solution of bromcresol purple/l. Milk coagulation times and biochemical characteristics of g (dwarf), R and S variants isolated were determined. S did not produce C4 compounds; the majority of R variants produced the compounds, and all g variants did so, mostly in large quantities. S variants were the most active acid formers; the activity of g variants was generally low, and they were heterofermentative. SKK

87

[Starters: I. Function, properties and composition.]
Kriel, J. B.
South African Journal of Dairy Technology 8 (4) 191-194 (1976) [Af] [Navorsingsinst. vir Vee-en Suiwelkunde, Irene 1675, South Africa]

This article (No. 17 in a series of educational articles) briefly recounts the history of the development of lactic acid bacteria starters and goes on to describe the properties and metabolism of the starter organisms. The functions of the starter are then discussed, as well as factors affecting them (genetic properties of the starter bacteria, composition of starter milk, presence of inhibitory or stimulating substances in the milk, contamination with bacteriophages or other organisms, and methods of starter cultivation and handling). Finally the merits of single-strain starters vs. mixed starters are examined. The former are used mainly in Australia and New Zealand, and the latter in Europe, USA and South Africa. It is pointed out that single-strain starters have the advantage that their activity is easy to predict and control, but their acid production may be totally inhibited in the event of bacteriophage contamination and certain strains tend to cause off-flavours. ADL

88

[Heat resistance of Str. lactis bacteriophages isolated in cheesemaking.]
Tsaneva, K.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 21 (1) 211-217 (1974) [14 ref. Bg, en, ru]

75 Streptococcus lactis bacteriophages isolated during production of White Pickled cheese were tested for their heat resistance. They were classified into 3 types, on the basis of morphological and serological properties, and into 8 lytic groups, on the basis of their spectrum of activity. The most heat-resistant withstood heating for 10 min at 74° C, and the most thermolabile were destroyed after 10 min at 62-66° C. The temp. used for pasteurization of milk for White Pickled cheese (68-72° C) did not destroy all the phages. The survival curves after heat treatment were bimodal, and the thermal inactivation process did not appear to be a kinetic reaction of the 1st order. It is thought that the non-linear nature of the curves may be due to the fact that 2 or more components of the phage particles are involved in the reaction. There appeared to be some relationship between the serological/morphological classification of the phages and their heat resistance. ADL

89

The ripening of Gouda cheese made under strict aseptic conditions. I. Cheese with no other bacterial enzymes than those from a starter streptococcus.
Kleter, G.
Netherlands Milk and Dairy Journal 30 (3/4) 254-270 (1976) [19 ref. En, nl] [Dep. of Food Sci., Univ. of Agric., Wageningen, Netherlands]

Gouda cheese was made under aseptic conditions as described in FSTA (1976) 8 2P240. To each 40 l. milk, 10 ml Seitz-filtered rennet and 240 ml Streptococcus cremoris E8 starter culture, grown in heat-sterilized skim-milk, were added. In some experiments gluconolactone was added in place of the starter. Organoleptic and bacteriological tests and measurements of the moisture, pH, fat, total N, non-coagulable N and amino acid N contents of the cheeses during 6 months ripening at 14° C and 82% RH, showed that it was possible to make a normal Gouda cheese when only the bacterial enzymes from the starter culture were present. In the absence of a starter culture the cheese had a low amino acid N content and no cheese flavour; a bitter flavour developed after several months of ripening. It is concluded that the Str. cremoris starter culture plays a major role in the ripening of Gouda cheese. MEG

90

Influence of Lactobacillus bulgaricus on commercial Swiss cheese.
Biede, S. L.; Reinbold, G. W.; Hammond, E. G.
Journal of Dairy Science 60 (1) 123-125 (1977) [7 ref. En] [Dep. of Food Tech., Iowa State Univ., Ames, Iowa 50011, USA]

Swiss cheese was manufactured on a commercial scale with different amounts of L. bulgaricus. As the amount of L. bulgaricus was increased from 0 to 2500 ml of a 16 h culture/9080 kg of milk, the cheese showed decreased numbers of propionibacteria (from 184×10^7 to 61×10^7), increased free proline (from 100 to 191 mg/100 g cheese) and proteolysis (from 2.98 to 4.53 absorbency units/g cheese), and more intense flavours. Diacetyl, propionic acid, and acetic acid were not changed significantly by the amount of L. bulgaricus added. LMB

91

[Method for preparation of an inoculum for cultured milk products.]
Koroleva, N. S.; Bannikova, L. A.; Zadoyana, S. B.; Tsaregradskaya, I. V.; Pyatnitsyna, I. N.; Maksimova, A. K.; Mytnik, L. G.; Trudzinskaya, E. E. Union of Soviet Socialist Republics, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti
USSR Patent 516 393 (1976) [Ru]

The method includes selection of mesophilic streptococci (Streptococcus lactis, Str. cremoris and Str. acetoinicus) according to acid production, organoleptic characteristics, microscopic appearance, relationship to phage, and growth in litmus milk. The suitability of the mesophilic streptococci for combined cultivation in sterile skim-milk at 25-26° C with transfer every 15 days for 1.5-2.5 months and subsequent checking of activity and characteristics is also important. The aim is to obtain starters resistant to seasonal changes in milk quality by checking the level of viable organisms, their morphology, proteolytic activity in the first 6-8 days of cultivation, antagonism to heat-resistant bacilli and lysogenic activity, 1 strain of each species being selected. W&Co

92

Growth response of Bifidobacterium bifidum to a hydrolytic product isolated from bovine casein.
Kehagias, C.; Jao, Y. C.; Mikolajcik, E. M.; Hansen, P. M. T.
Journal of Food Science 42 (1) 146-150 (1977) [27 ref. En] [Dep. of Food Sci. & Nutr., Ohio State Univ., Columbus, Ohio 43210, USA]

The growth response of B. bifidum subsp. pennsylvanicus to a hydrolytic product obtained during the isolation of sialic acid from bovine isoelectric casein was studied. This product was previously identified as a casein bifidus factor (CBF) [Journal of Dairy Science (1976) 59 (10) 1718-1726]. Growth was measured turbidimetrically by addition of CBF (250 ppm) to ATCC Medium 76. Stimulation by CBF was comparable to that obtained with N-acetylglucosamine. Whole casein, sialic acid-free casein and κ-casein failed to stimulate the growth of the organism to the level achieved with CBF. The CBF fraction contained 0.15% phosphorus, 7% free lactose and various peptides. No sialic acid or other amino sugars were detected. On the basis of phosphorus content and amino acid analysis it was concluded that CBF was probably a degradation product of κ-casein. LMB

93

The use of a commercial Pediococcus cerevisiae starter culture in the production of country-style hams.
Bartholomew, D. T.; Blumer, T. N.
Journal of Food Science 42 (2) 494-497 (1977) [17 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Hams were inculated with P. cerevisiae cells to determine effects of lactic acid starter culture on country-style ham quality. Treatments consisted of 2 different cure mix levels [50 and 70 g/kg of ham], 3 ageing times [80, 95 and 110 days], and 5 inoculum levels [0, 1.2×10^4, 4.0×10^6, 7.5×10^6 and 2.3×10^7 cells/g of ham]. Hams were subjected to taste panel, physical, chemical, and microbial analyses. Acidity and white film formation on cut surfaces were higher for inoculated hams although taste panel analyses indicated little difference from control hams. Increased aged flavour and nutty flavour were noted at the higher NaCl level. Inoculated hams decreased in pH during the initial days of ageing but increased later in the ageing period. Increases in pH and the concomitant development of aged flavour confirmed previous work done on flavour that ⩾80 days processing time must elapse before aged flavour becomes acceptable. The total time required to produce aged hams may be shortened by inoculating with P. cerevisiae. IFT

94

Microbial interactions in country-style hams.
Bartholomew, D. T.; Blumer, T. N.
Journal of Food Science 42 (2) 498-502 (1977) [27 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Hams were inoculated with Pediococcus cerevisiae cells to determine effects of a lactic acid starter culture on resident microflora of hams. But microflora of control hams consisted largely of lactobacillu, whereas coagulase-negative staphylococci were most prevalent in the cushion. Inoculated hams were predominated by P. cerevisiae in both butt and cushion areas. Other bacteria isolated included faecal streptococci, Enterobacteriaceae, micrococci, bacilli, and yeasts. The natural flora of country-style ham appeared to be antagonized by P. cerevisiae, while a staphylococcal isolate and faecal streptococci were most antagonistic to the natural flora on agar media. IFT

95

Fortification of foods by fermentation with lysine-excreting mutants of lactobacilli.
Sands, D. C.; Hankin, L.
Abstracts of Papers, American Chemical Society 170, AGFD 10 (1975) [En] [Dep. of Plant Path., Connecticut Agric. Exp. Sta., Box 1106, New Haven, Connecticut 06504, USA]

Some wild-type microorganisms and mutants have been found which excrete specific amino acids. Some of these microorganisms are used to manufacture amino acids through fermentation procedure but none has been used directly to augment the amino acid content of food produced by fermentation. Lysine analogues were used to select for spontaneous mutants of lactobacilli that over-produce and excrete lysine. Both wild-type Lactobacillus acidophilus and a lysine-excreting mutant were used to ferment soybean milk to yoghurt. The wild type decreased the lysine content of the soymilk by 20% whereas the mutant increased it by 14%. The use of lysine-excreting mutants in producing fermented foods is compared to direct fortification of foods with lysine and modification of plant protein through genetics. AS

96

The formation of off-flavour from sorbic acid by lactic acid bacteria. (In '5th International Fermentation Symposium' [see FSTA (1977) 9 8G557].) [Lecture]
Radler, F.
p. 366 (1976) [4 ref. En] [Inst. für Mikrobiol. & Weinforschung, Johannes Gutenberg Univ., Mainz, Federal Republic of Germany]

Following a brief review of studies which examined off-flavour formation in sorbic acid-treated wines, a study of the microbiological aspects of the formation of a geranium-like flavour from sorbic acid is reported. On the basis of results of studies with MRS [deMan, Rogosa & Sharpe] medium and dil. grape must containing 500 mg sorbic acid/l. and inoculated with 104 strains of lactic acid bacteria, it is concluded that formation of geranium-like flavour is characteristic of strains (not species) of heterofermentative lactic acid bacteria. The geranium flavour appeared when only 50-100 mg/l. of the sorbic acid had disappeared from the media. Leuconostoc oenos was isolated from a red wine having a strong geranium flavour. Formation of hexadien-1-ol (a constituent of the geranium flavour) from sorbic acid by 3 heterofermentative bacteria was also studied. It is assumed that hexandien-1-ol is not the only compound produced from sorbic acid. JA

97

[Mechanism of malo-lactic fermentation in wines.]
Lonvaud, M.; Lonvaud-Funel, A.; Ribereau-Gayon, P.
Connaissance de la Vigne et du Vin **11** (1) 73-91 (1977) [24 ref. Fr, en, de, es, it] [Inst. d'Oenologie, Univ. de Bordeaux II, 351 Cours de la Liberation, 33405 Talence, France]

Crude cell-free extracts of Lactobacillus plantarum ATCC 8014 were prepared and tested for malic enzyme activity as described in FSTA (1973) 5 9H1384. The extract were purified by the successive steps of heat treatment in the presence of $MnCl_2$, the malic enzyme being stabilized by addition of its substrate; removal of residual nucleoproteins by protamine sulphate; selective protein precipitation with $(NH_4)_2SO_4$; solution of the precipitate in phosphate buffer; fractionation on Sephadex G-100; and chromatography of active fraction on a hydroxyapatite column. At each step, specific activities of the malic enzyme (μmol CO_2 min^{-1} mg $protein^{-1}$) and of lactate dehydrogenase (μmol NADH oxidized min^{-1} mg $protein^{-1}$) were measured. Specific activities of the malic enzyme and lactic dehydrogenase respectively were 3.0 and 6.6 in the crude extract, and after the final purification step were 90.0 and 12.0. It is concluded that the experiments have demonstrated the presence in bacteria responsible for the malo-lactic fermentation of wines of a specific malo-lactic enzyme capable of converting malate into lactate without the intervention of lactate dehydrogenases. SKK

98

Production of dextran from sucrose by Leuconostoc mesenteroides L-M 523.
Sheikh, N. M.; Horsain, M.
Bangladesh Journal of Scientific and Industrial Research **10** (1/2) 80-83 (1975) [11 ref. En] [Ind. Microbiol. Sect., BCSIR, Dacca, Bangladesh]

Optimum conditions for the production of dextrans by L. mesenteroides L-M 523 were determined. Max. yield of clinical grade dextran fractionated by methanol was 7.5% (mol. wt. 44 800) and that fractionated by ethanol was 8.2% (mol. wt. 99 000) based on the commercial sucrose used. The fermentation medium contained 10% commercial sucrose and 0.5% K_2HPO_4 at pH 5.5-5.8. The fermentation was completed in 24 h at 30° C in stationary conditions. AS

99

[Refresher meeting on the use of lactic acid bacteria in the dairy industry.] [Conference proceedings] **Italy**, Societa Italiana di Microbiologia Applicata
Latte **2** (1) 2-3, 5-7, 9-16, 18-20, 22-29, 31-39, 41-46, 48-52 (1977) [many ref. It]

The meeting held in Milan on 25 Nov. 1976 by the new Italian Society of Applied Microbiology included the following papers: Brief description of the Dairy Research Institute at Lodi, by G. C. Emaldi (pp. 5-6); Quality of milk and use of starters in France, by G. Mocquot (p. 7); Developments in cheesemaking and the use of lactic acid bacteria, by G. C. Emaldi (pp. 9-11); Use of lactic acid bacteria in cheesemaking, by C. Ghitti (pp. 12-16); Lactic acid bacteria for soft and blue cheeses, by B. Bianchi-Salvadori (pp. 18-20, 6 ref.); Bacteriophage infections, by T. Sozzi (pp. 31-36, with 10 electron micrographs); Use of selected starters in the manufacture of yoghurt, by E. Quaroni (pp. 41-42); Production of soft cheese with selected starters, by T. Farinotti (pp. 43-44); Use of mesophilic starters in cheesemaking, by V. Vescovini (pp. 45-46); and Aseptic preparation of lactic starters, by G. B. Joahnsen [G. B. Johannsen] (pp. 48-52, 6 ref.). See 2 following abstr. for further papers from this meeting. JMD

100

Hydrolysis of milk proteins by bacteria used in cheese making.
Schmidt, R. H.; Morris, H. A.; Castberg, H.; McKay, L. L.
Abstracts of Papers, American Chemical Society **170**, AGFD 11 (1975) [En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St Paul, Minnesota 55108, USA]

Cells of Streptococcus lactis C2 and Str. cremoris ML1 harvested from Elliker's broth during late log, stationary and early death phases of growth were ruptured and fractionated into soluble, membrane and ribosomal fractions. The soluble fraction contained the highest enzyme activity on selected dipeptides and whole casein while the ribosomal fraction contained the least. Str. lactis had higher

activity than Str. cremoris. Activity on whole casein was much lower in cells harvested during early death phase than during late log phase of growth while dipeptidase activity was relatively constant. DMK

101

[On the lactic acid bacteria of cheeses.] [Review]
Kikuchi, T.
Japanese Journal of Dairy and Food Science [Rakuno Kagaku Shokuhin no Kenkyu] **25** (6) A185-A193 (1976) [11 ref. Ja]

102

[Relation between malo-lactic fermentation and organoleptic evaluation of wines.]
Otsuka, K.; Iimura, Y.; Sodeyama, M.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] **71** (9) 723-725 (1976) [3 ref. Ja, en] [Nat. Res. Inst. of Brewing, Kita-ku, Tokyo, Japan]

The malo-lactic fermentation rate was estimated by calculating the ratio of lactic acid in total acid (lactic acid + malic acid). There was a correlation between the organoleptic evaluation of the wines and the malo-lactic fermentation rate, the correlation coeff. being -0.0347 in white wines (n = 45) and 0.6717 in red wines (n = 31). YN

103

Malo-lactic fermentation in South African table wines.
Wyk, C. J. van
American Journal of Enology and Viticulture **27** (4) 181-185 (1976) [20 ref. En] [Dep. of Oenology, Univ. of Stellenbosch, Stellenbosch 7600, South Africa]

See FSTA (1976) 8 12H2209.

104

[Microecological studies on lactic acid bacteria in molasses distilleries. I. Isolation and identification of lactic acid bacteria. II. Studies on inhibitory activity of the metabolic products alcohol, lactic acid and acetic acid. III. Continuous culture of the distillery yeast Saccharomyces cerevisiae strain M with lactic acid bacteria isolated in molasses distilleries.] Mikroökologische Studien zur Milchsäurebakterienflora der Melassebrennereien. I. Isolierung und Identifizierung der Milchsäurebakterien. II. Untersuchungen über die Hemmwirkung der Stoffwechselprodukte Alkohol, Milchsäure und Essigsäure. III. Kultivierung der Brennereihefe Saccharomyces cerevisiae Rasse M mit einigen aus Melassebrennereien isolierten Milchsäurebakterien in kontinuierlichen Mischkulturen.
Röcken, W.
Branntweinwirtschaft Sonderbeilagen: **116** (8) 1-9; (11) 1-6; (13) 1-7 (1976) [129 ref. De] [Inst. für Gärungsgewerbe & Biotech., Berlin (West)]

The lactic acid bacteria flora of batch and continuous molasses distilleries were studied. 147 strains were isolated: 139 Lactobacilleae and 8 Streptococceae. Batch fermentations had a varied microflora; in continuous fermentations, only Lactobacillus plantarum was commonly found. Laboratory studies were conducted on inhibition of the distillery yeast Saccharomyces cerevisiae strain M by lactic acid and acetic acid (formed by lactic acid bacteria). A min threshold concn. was necessary for any inhibition; at higher concn., yeast activity decreased in proportion to acid concn. Inhibitory activity of acetate was greater than that of lactate; effects of the 2 acids were additive. Fermentation was inhibited to a greater extent than multiplication. Inhibition of lactic acid bacteria by alcohol was also studied; inhibitory effect increased with increasing alcohol concn., above a min. threshold value. The alcohol concn. achieved in distillery fermentations were, however, inadequate to control growth of lactic acid bacteria. The yield losses attributable to infection of the mash with lactic acid bacteria are discussed, with reference to the relative effects of homofermentative and heterofermentative strains. TUB-IGB

105

The relationship between Lactobacillus mali from cider and Lactobacillus yamanashiensis from wine.
Carr, J. G.; Davies, P. A.; Dellaglio, F.; Vescovo, M.; Williams, R. A. D.
Journal of Applied Bacteriology **42** (2) 219-228 (1977) [19 ref. En] [Long Ashton Res. Sta., Long Ashton, Bristol BS18 9AF, UK]

The 2 species, Lactobacillus mali and L. yamanashiensis, have been compared using the following criteria: morphological observations and biochemical tests; amino acids of the cell wall mucopeptides; % G + G ratios and DNA homology. These tests have shown these organisms to be similar but not identical. Their similarity is, however, sufficiently great to consider them as one species. Owing to priority of publication L. yamanashiensis is proposed for the specific name and culture No. 239 as the type strain. All organisms previously known as L. mali will in future be called L. yamanashiensis subsp. mali. AS

106

The growth and some enzymatic functions of UV-mutants of Streptococcus diacetilactis 239.
Piatkiewicz, A.; Kasperkiewicz-Jamroz, T.
Acta Alimentaria Polonica **2** (4) 321-333 (1976) [30 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiol., Politech., Lodz, Poland]

Mutants obtained by UV-irradiation of Str. diacetilactis 239 all had similar growth curves, and showed max. biomass yields 6-20% greater than that of the parent strain. The mutants showed sugar utilization and acid-producing activities similar to those of the parent strain, but production of diacetyl and acetoin in 6 of the 10 mutants was 50-

125 mg/100 ml (vs. 43 mg/100 ml for the parent strain). The most pronounced difference (both qualitative and quantitative) between the mutants and parent strain was in their proteolytic activity towards casein; the mutants accumulated larger amounts of amino acids in the culture medium, but none produced a bitter flavour in milk. CDP

107

Failure of streptococci isolated from plant sources to be classified serologically into known groups.
Green, B.; Wust, C. J.; Mundt, J. O.
Abstracts of the Annual Meeting of the American Society for Microbiology 77, 257 (1977) [En] [Univ. of Tennessee, Knoxville, Tennesse, USA]

The majority of streptococci isolated from plant and food sources in the authors' laboratory were not readily classified by physiological techniques. In addition, DNA of such select atypical isolates does not show any significant homology by hybridization procedures to DNA of several known groups of streptococci. Representative isolates of diverse physiological characteristics were studied with known serological reagents specific for group classification of streptococci. Although these isolates agglutinated with some group-specific antisera, 5 out of 8 did not react with any antisera in the more definitive precipitation procedure using the group carbohydrate that is isolated by the Lancefield method. Furthermore, rabbit antisera made to the isolates did not react appreciably with known group antigens. Of the 3 isolates that did react with known grouping antisera, by the precipitin method, one was a Group N but showed physiological characteristics of enterococci and 2 were Group D but had other properties closer to Streptococcus lactis (Group N). The isolates were related to each other by serological procedures. These results suggest that isolates from plant or food sources may represent new taxa on the level of species. AS

108

Isoleucine production in bifidobacteria.
Matteuzzi, D.; Crociani, F.; Emaldi, O.; Selli, A.; Viviani, R.
European Journal of Applied Microbiology 2 (3) 185-194 (1976) [26 ref. En] [Istituto di Microbiol. Agraria e Tecnica, Fac. di Agraria, Univ. di Bologna, Bologna, Italy]

About 300 strains of bifidobacteria were examined for their capacity to release L-isoleucine in the fermentation broth. A strain of Bifidobacterium ruminale was selected as the best producer. After treatment of this strain with N-methyl-N'-nitro-N-nitrosoguanidine a DL-α-aminobutyric acid-resistant mutant capable of producing about 5 mg/ml of L-isoleucine in presence of 1.5% DL-α-aminobutyric acid was obtained. Cultural conditions and acetohydroxyacid synthetase activity were studied. AS

109

[Biogenic amines in foods. Studies on wine and sauerkraut.] Biogene Amine in Lebensmitteln. Eigene Untersuchungen in Wein und Sauerkraut. [Lecture]
Mayer, K.
Qualitas Plantarum - Plant Foods for Human Nutrition 26 (1/3) 263-269 (1976) [4 ref. De, en] [Eidgenössische Forschungsanstalt für Obst-, Wein- & Gartenbau, CH-8820 Wädenswil, Switzerland]

A brief account is given of studies on formation of histamine and other toxic biogenic amines in wines. Analysis of 450 wine samples showed the mean histamine content of red wines to be 3.3-3.8 mg/l., vs. 1.1-1.2 mg/l. for white wines. 26% of red wines and 5% of white wines had histamine concn. >5 mg/l. Studies on a further 282 wines showed that histamine concn. increased with increasing wine pH; histamine concn. was also closely related to the count of Pediococcus cerevisiae. Significant concn. of tyramine, phenylethylamine, putrescine and cadaverine were also detected in wines. A brief account is also given of formation of histamine during sauerkraut fermentation. Pediococcus cerevisiae commonly appears if the sauerkraut reaches pH <4.0, and may produce large quantities of histamine (⩽200 mg/kg) and other volatile amines. To avoid this, pasteurization of the sauerkraut when it reaches pH 4.0 is recommended. [See FSTA (1977) 9 10J1369.] AJDW

110

Role of malate in the metabolism of malo-lactic bacteria.
Pukrushpan, L.; Kunkee, R. E.
Abstracts of the Annual Meeting of the American Society for Microbiology 77, 257 (1977) [En] [Univ. of California, Davis, California, USA]

L-malate is nearly stoichiometrically decarboxylated to L-lactate by certain lactic acid (malo-lactic) bacteria found in wine. However, in Leuconostoc oenos ML34, a small portion of malate is oxidatively decarboxylated to pyruvate and malate stimulates the initial growth rate of the bacteria. The effect of malate on the enzymology and on the growth of many other malo-lactic bacteria was measured to test the hypothesis that a stimulation of growth rate resulting from malate utilization is brought about by the formation of H acceptor, from pyruvate, which 'sparks' the initial growth rate. Of all of the organisms tested, only 2 showed the stimulation of growth rate and only in these 2 was any pyruvate found. These 2 organisms were also those which were best able to carry out a natural malo-lactic fermentation in wine. From these results, it was concluded that malate has a role in the metabolism of some malo-lactic bacteria by providing H acceptor which stimulates their initial growth. With the other organisms tested, malate had no effect with most, was inhibitory to one, and could itself be used as an energy source by another. AS

111

[Process for production of bacterial concentrates, especially of a symbiont culture concentrate for yoghurt production.] Verfahren zur Herstellung von Bakterienkonzentraten, insbesondere eines Symbiontkulturenkonzentrates für die Herstellung von Joghurt, und Nährmedium zum Durchführen des Verfahrens.
Kapoor, J. P. Germany, Federal Republic of, Laboratorium für angewandte Mikrobiologie
German Federal Republic Patent Application 2 455 833 (1976) [Dc]

A suitable nutrient medium is inoculated with active bacteria and incubated at 42° C until a pH-value of about 4.5-4.58 is reached. The pH-value is then adjusted to approx. 6.3 and the nutrient medium rapidly cooled. A suitable medium is composed of 2.5% spray-dried skim-milk, 2.5% spray-dried sweet whey, 0.5% yeast extract, 0.5% lactose, 0.25% sucrose, 5.85 mg $CaCl_2.2H_2O$/l., 0.12 mg $MgSO_4.7H_2O$/l., 0.2% K_2HPO_4 (anhydrous), 0.002% bacterial proteinase and water. The process makes it possible to obtain concentrates of individual bacteria, e.g. Lactobacillus bulgaricus, as well as mixed culture concentrates. The latter have a longer shelf life. W&Co

112

[Effect of whey proteins on accumulation of SH. and SS-groupings in culture media of some lactic streptococci.]
Tolkachev, A. N.; Zvyagintsev, V. I.; Krasheninin, P. F.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 11, 54-56, 88 (1973) [9 ref. Ru] [VNIIMiSP, Uglich, USSR]

Samples of whey proteins obtained by heat, acid, $CaCl_2$ or acid/alkali treatment were freeze-dried and added at 0.4, 0.8 or 1.5 g to 200-ml batches of skim-milk; the mixtures were sterilized at 120° C for 10 min; after cooling, cultures of lactic streptococci and rennet sterilized by Seitz filtration were added; incubation was carried out at 28° C for 7 days; the incubate was centrifuged and the contents of SH- and SS-groups were determined in the supernatant liquid. A mixed culture of 3 strains of Streptococcus cremoris and 2 of Str. acetoinicus, or separate strains of Str. lactis and Str. cremoris were used. Amounts of the 2 S groups increased in all experiments with increase in whey protein addition, greatest increase being with proteins obtained by heat treatment, and least increase with proteins obtained by acid/alkali treatment. No correlation was found between contents of the groupings and appearance of bitter taste. Suggestions on selection of cheese starters based on the findings are presented. SKK

113

[Isolation and identification of lactobacilli antagonistic to butyric acid bacteria and coliforms.]
Khandak, R. N.; Gudkov, A. V.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 11, 3-7 (1973) [8 ref. Ru] [VNIIMiSP, Uglich, USSR]

Numerous strains of lactobacilli were isolated from high-quality Kostroma cheese, and tested for antagonism to strains of Escherichia coli 17, and Clostridium tyrobutyricum 1755. Those most promising were identified by the method of Sharpe & Fryer [Laboratory Practice (1965) 14 (6) 697], and 5 strains of Lactobacillus plantarum and 8 strains of L. buchneri were finally selected. Incorporation of some of them into cheese starters enabled production of high quality cheese from milk artificially contaminated with 2000 E. coli cells and 80 Cl. tyrobutyricum spores/ml, while cheese made from the same milk using customary starters proved to be substandard. Examination of 50 strains of lactic streptococci showed that 37 (particularly those of Streptococcus lactis, Str. diacetilactis and Str. paracitrovorus) inhibited growth of E. coli, but none were active against Cl. tyrobutyricum. SKK

114

[Sources of bacteriophages of lactic acid bacteria in the experimental factory of the All-Union Butter and Cheese Industry Research Institute.]
Gudkov, A. V.; Pak, V. B.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 11, 47-54 (1973) [14 ref. Ru] [VNIIMiSP, Uglich, USSR]

Samples of raw milk, pasteurized milk, coagulum, whey and starter in the cheese factory of the authors' Institute were tested for bacteriophage incidence, using as test cultures 38 strains of Streptococcus lactis, 29 of Str. diacetilactis, 26 of Str. cremoris, and 8 of Str. paracitrovorus from the factory collection. In a 1st series of experiments, these strains did not form part of the starters used in cheesemaking; and in a 2nd series presence of bacteriophages against starter strains was studied. Main findings included: the bacteriophage sources were primarily within the factory; pasteurization (72° C for 15-20 s) destroyed 75% of the raw milk bacteriophages: occasional breakdowns in hygiene measures caused secondary contamination of pasteurized milk and starters; the greatest incidence of highly active bacteriophages with high titre was in whey after scalding; and Str. diacetilactis strains were the most sensitive, probably because of their predominance in the Uglich starters. SKK

115

New techniques in handling lactic cultures to enhance their performance.
Sandine, W. E.
Journal of Dairy Science 60 (5) 822-828 (1977) [31 ref. En] [Dep. of Microbiol., Oregon State Univ., Corvallis, Oregon 97331, USA]

New techniques developed to solve the problem of phage inhibition of starter cultures are outlined, and problems associated with starter culture instability, inhibition by antibiotics, agglutination

starter bacteria, poor bulk starter media and lack of uniformity of flavour production are discussed. MEG

116

Preparation and storage of concentrated cultures of lactic streptococci. [Review]
Gilliland, S. E.
Journal of Dairy Science 60 (5) 805-809 (1977) [24 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

This review discusses methods used to produce concentrated starter cultures and to evaluate cell crop. Cultural conditions (particularly the regulation of pH) giving max. cell yield are described. Stability of the concentrated cultures during freezing and storage in liquid N is also considered. MEG

117

Antibiosis by lactic culture bacteria. [Review]
Babel, F. J.
Journal of Dairy Science 60 (5) 815-821 (1977) [37 ref. En] [Purdue Univ., West Lafayette, Indiana 47907, USA]

This review article describes early observations of antibiosis (an antagonistic association between microorganisms to the detriment of one of them) in milk, and the isolation of diplococcin and nisin from cultures of Streptococcus cremoris and Str. lactis. Microbial inhibitation by cultures of Leuconostoc cremoris and Str. lactis subsp. diacetylactis, and the production of inhibitory substances by strains of Str. lactis and Str. cremoris are also discussed. Practical applications of antibiosis include: addition of a lactic culture to raw milk to limit growth of psychrotrophic bacteria; a creaming mixture for Cottage cheese prepared with L. cremoris to prevent slime formation by Pseudomonas fragi or P. putrefaciens and to inhibit coliforms; and inhibition of butter-spoilage bacteria by the presence of butter culture. MEG

118

[Effect of enterococci on the technological properties of lactic acid bacteria. I. Acid formation by and proteolytic characteristics of lactic streptococci.] Beiträge zum Einfluss der Enterokokken auf technische Eigenschaften der Milchsäurebakterien. I. Säurebildung und proteolytische Eigenschaften der Milchsäurestreptokokken.
Usajewicz, I.; Knaut, T.
Archiv für Lebensmittelhygiene 27 (5) 165-170 (1976) [33 ref. De, en] [Inst. für Ing.-Wesen & Biotech. der Lebensmittel, Landwirtschaftlich-Tech. Hochschule, Olsztyn, Poland]

Model experiments were made with 4 enterococcal strains (Streptococcus faecalis subsp. liquefaciens T17, Str. faecalis T33, Str. durans T18, Str. bovis T19) in the form of mixed cultures, heat-inactivated cultures and cell-free filtrates to determine their effect on the acid production and proteolytic properties of lactic streptococci used as cheese starters (Str. lactis strains 25, 26 and 27, growing slowly with little acid production; and Str. lactis strains 4 and 24, and Str. cremoris 20, characterized by rapid growth and intensive acid production). Results indicated that the relationship between the 2 groups of bacteria depended on the nature of the enterococci and on the original activity of the lactic streptococci. Str. faecalis subsp. liquefaciens and Str. bovis intensified the acid production of the slow-growing Str. lactis strains, e.g. Str. faecalis subsp. liquefaciens increased the acid production of Str. lactis 25 by 30-60% in mixed cultures and by 80-130% when added as inactivated culture or cell-free filtrate. The other strains (Str. faecalis and Str. durans) had less effect on acid production in mixed cultures and no effect at all as inactivated cultures or cell-free filtrates. Effects on proteolytic properties varied greatly and were difficult to interpret. The inactivated cultures and cell-free filtrates of the enterococci influenced proteolysis (as measured by liberation of N soluble in 12% trichloroacetic acid) in all the lactic streptococci, but the nature and degree of this influence was not clearly related to the original activity of the cultures. In general, however, the enterococci tended to stimulate soluble N production in the fast-growing cultures and inhibit it in the slow-growing cultures. They had no effect on liberation of amino acids (as measured by amino N). ADL

119

Influence of lactic streptococci on bitter flavor development in cheese.
Lowrie, R. J.
Journal of Dairy Science 60 (5) 810-814 (1977) [33 ref. En] [Food Res. Inst., Res. Branch, Agric. Canada, Ottawa, Ontario K1A 0C6. Canada]

Bitter flavour development in Cheddar cheese made with Streptococcus cremoris HP was reduced when the cheese was deliberately infected with bacteriophage. Prevention of bitterness by careful selection of lactic streptococci starters is suggested. MEG

120

Culture medium and method of preparing bulk starters for Italian cheese manufacture.
Reinbold, G. W.; Reddy, M. S. Leprino Cheese Co.
United States Patent 3 998 700 (1976) [En]

Optimum ratios of Streptococcus thermophilus to Lactobacillus spp. in bulk starters for the manufacture of pasta filata type cheeses are obtained by a combination of 15-25 parts (by wt.) of acid-whey solids and 75-85 parts of sweet-whey solids (preferable partially delactosed) in the bulk starter medium. EJM

121

[Use of growth stimulators of the KMB-12 type in media for accumulation of lactic acid bacteria biomass.]

Gudkov, A. V.; Khandak, R. N.; Mikhlin, E. D.
Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 11, 7-15 (1973) [7 ref. Ru] [VNIIMiSP, Uglich, USSR]

The dry KMB-12 preparation [? extracted from thermophilic methane bacteria] manufactured by the Grozny acetone factory was added to whey media for culturing lactic streptococci starters. A rectilinear relationship was found between increase in biomass and KMB-12 concn. in the 0-6 g/l. range. A simple and cheap medium consisting of defatted whey, KMB-12, sodium citrate and $MnSO_4$ is suggested as substitute for hydrolysed milk and yeast autolysate in starter production. It gave high yields of biomass without affecting its physiological properties. Cheeses made with commercial starters so produced, proved equal in quality to those made with customary starters. SKK

122

Influence of medium and temperature on end products and growth.

Collins, E. B.
Journal of Dairy Science 60 (5) 799-804 (1977) [25 ref. En] [Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Characteristics are described of lactic streptococci (mainly Streptococcus lactis, Str. cremoris and Str. diacetylactis) used in single or mixed strain cultures in the manufacture of buttermilk or cheese. Influence of temp. on growth of different strains of lactic streptococci, and the production of products other than lactic acid (e.g. acetate and CO_2) from low concn. of glucose and galactose are also discussed. MEG

123

[Effect of a Lactobacillus starter culture in vacuum-packaged meat on Salmonella and Pseudomonas organisms.]

Tezcan, I.; Yücel, A.
Veteriner Hekimler Dernegi Dergisi 45 (4) 7-10 (1975) [5 ref. Tr, en] [Vet. Fac., Univ., Ankara, Turkey]

Buttermilk with a high content of lactobacilli was added before vacuum packaging to 3 samples comprising portions of leg of beef, (i) alone, (ii) + Salmonella spp., (iii) + Pseudomonas fluorescens. Beef samples without buttermilk were used as controls. The samples were examined after storage for 2, 4 and 6 wk at +4° C. The addition of buttermilk resulted in a slight increase in tenderness, but the meat developed an acid flavour. The buttermilk inhibited growth of Salmonella and Pseudomonas spp. ADL

124

Amino acid profiles and presumptive nutritional assessment of single-cell protein from certain lactobacilli.

Erdman, M. D.; Bergen, W. G.; Reddy, C. A.
Applied and Environmental Microbiology 33 (4) 901-905 (1977) [27 ref. En] [Dep. of Anim. Husbandry & Microbiol. & Public Health, Michigan State Univ., East Lansing, Michigan 48824, USA]

Amino acid composition of single-cell protein (SCP) from Lactobacillus acidophilus, L. bulgaricus, L. fermenti, L. plantarum, L. thermophilus, L. casei and L. delbrueckii was determined and compared with that of other SCP and of conventional foods (beef, egg, soybean and wheat). Although differences in individual Amino acid contents were observed between the Lactobacillus sp. and between strains within a sp., the essential amino acid composition of SCP from lactobacilli appears to be comparable to that of the FAO reference protein. MEG

125

[Natural and induced malo-lactic fermentation of wines.]

Menezes, T. J. B. de; Hashizume, T.; Almeida Lima, U. de
Coletanea do Instituto de Tecnologia de Alimentos 7 (2) 467-484 (1976) [28 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Av. Brasil 2880, Caixa Postal 139, Campinas, Sao Paolo, Brazil]

Studies were conducted on induced malo-lactic fermentation of red and white wines, using 3 pure cultures of malo-lactic bacteria. 6 batches of red wines and 3 batches of white wines were used in the experiments. Tables of data are given for the pH, total acidity, volatile acidity, alcohol content, SO_2 content and % conversion of malic acid in the wines after malo-lactic fermentation, and for changes in the malic acid content of wines during a period of $\leqslant$276 days after inoculation. The results show that 3 of the 6 inoculated red wines and 2 of the 3 inoculated white wines underwent full malo-lactic fermentation; the other inoculated samples (and control non-inoculated samples) underwent partial malo-lactic fermentation. Malo-lactic fermentation was most rapid during the first 25 days. 1 of the 3 strains of malo-lactic bacteria tested was more tolerant to high acidity than the other 2; however, the 2 more sensitive strains gave better malo-lactic fermentation. AJDW

126

[Studies on malo-lactic bacteria isolated from wine.]

Menezes, T. J. B. de; Almeida Lima, U. de; Hashizume, T.; Romeu, A. P.
Coletanea do Instituto de Tecnologia de Alimentos 7 (2) 447-466 (1976) [20 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Av. Brasil 2880, Caixa Postal 139, Campinas, Sao Paolo, Brazil]

7 isolates of bacteria from wines (made from IAC-138-22 grapes) which had undergone malo-

lactic fermentation were studied. 3 strains were identified as Leuconostoc oenos. Growth characteristics and pH, temp. and ethanol tolerances were evaluated; effects of fermentation by the isolates on the composition of grape juice were studied. Tables of results are given. 4 strains were capable of causing malo-lactic fermentation of pasteurized wine. The potential for inoculation of wines with pure cultures of bacteria causing malo-lactic fermentation is discussed. AJDW

127

Examination and modification of the use of Leuconostoc mesenteroides for measurements of the sulfur-containing amino acids from Vigna unguiculata.
Hannah, L. C.; Rhodes, B. B.; Evans, I. M.
Journal of Agricultural and Food Chemistry 25 (3) 620-623 (1977) [9 ref. En] [Vegetable Crops Dep., Univ. of Florida, Gainesville, Florida 32611, USA]

The use of L. mesenteroides for the measurement of methionine and cyst(e)ine from the seed proteins of the legume V. unguiculata as well as Phaseolus vulgaris was examined and modified. Principal modifications include the use of buffers in neutralization and pronase hydrolysis. Pronase appears useful in the hydrolysis of seed proteins of V. unguiculata but not for those from P. vulgaris. The method, as modified here, recovers as much methionine as that measured by an amino acid analyser. It was found that hydrolysis preceding amino acid measurement need not be complete since the bacteria can obtain methionine from di- and tripeptides. Methionine derivatives, known to be nutritionally inferior when fed to chicks, are shown to be inferior when fed to this bacterium. Bacterial growth rates obtained on each of the derivatives mimic those reported for chicks. Because of differential growth given by equal amounts of cysteine and cystine this method cannot give reliable measurements of these 2 amino acids. Further studies of this anomalous result suggest that cysteine must be converted to cystine before it supports bacterial growth. Other problems in the use of this assay are discussed, and it is suggested that it be used for routine screening assays. AS

128

[Application of pure dairy cultures of yeasts and bacteria for leaven used in commercial bakeries.]
Wlodarczyk, M.; Zajdel, M.; Augustyniak, M.
Przeglad Piekarski i Cukierniczy 25 (2) 26-27 (1977) [Pl]

Pure dairy cultures are propagated at 1 commercial bakery in Poland. Lactobacilli are cultivated for 24 h at 28°C in 20 l. flasks, and the inoculum is then supplied to individual bakeries. The initial mixed culture consists of Lactobacillus plantarum and L. brevis. This inoculum is added to leaven. Bread manufactured with the application of this culture has a very fine flavour and normal acidity. The leaven may be also improved by addition of Saccharomyces cerevisiae culture, fermenting simple sugars and maltose. STI

129

Aroma formation in lactic starter cultures.
Jönsson, H.; Pettersson, H.-E.
Nordisk Mejeriindustri 4 (5) 241, 245-247 (1977) [15 ref. En] [Central Lab., Svenska Mejeriernas Riksförening, Malmö, Sweden]

The authors discuss current theories concerning the metabolic pathway for diacetyl production in starters containing aroma-forming bacteria such as Streptococcus diacetilactis and Lactobacillus cremoris, and summarize results obtained in their own laboratory studies of citric acid fermentation in various types of starters. Their results tend to support the theory of Speckman & Collins that diacetyl is formed by intracellular enzymic condensation of acetyl-coenzyme A and active acetaldehyde [Journal of Bacteriology 95 (1968) 174-180]. According to their findings, α-acetolactic acid does not appear to be a precursor of diacetyl in starters, although it can be used in dairy technology to increase the diacetyl content of cultured milks and butter by spontaneous oxidative decarboxylation. Stress is laid on the need for an inert atmosphere in the distillation stage of procedures for determining the diacetyl content of starters. MEG

130

Factors affecting proteolysis in milk by Streptococcus cremoris.
Krishna, B. M.; Dutta, S. M.
Journal of Food Science and Technology, India 13 (5) 240-242 (1976) [14 ref. En] [Nat. Dairy Res. Inst., Karnal, Haryana, India]

Proteolysis of milk by Str. cremoris c-1 (measured as mg tyrosine liberated/g curd) decreased in the order: buffaloes' and cows' skim-milk, 10% reconstituted dried cows' skim-milk, goats' skim-milk. Proteolysis increased with increasing incubation temp. from 15° to 37°C, but was not improved by addition of metal ions. Str. cremoris had higher proteolytic activity in sterilized (121°C for 20 min) cows' skim-milk than in pasteurized (63°C for 30 min) skim-milk. MEG

131

Survival of some freeze-dried lactic cultures stored in gelatin capsules.
Lal, M.; Tiwari, M. P.; Sinha, R. N.; Ranganathan, B.
Journal of Food Science and Technology, India 13 (5) 266-267 (1976) [7 ref. En] [Div. of Dairy Bacteriology, Nat. Dairy Res. Inst., Karnal, Haryana, India]

To avoid problems encountered with glass falling into milk when glass ampoules of freeze-dried cultures are used as inocula, gelatin capsules containing 200 mg freeze-dried cultures of Streptococcus diacetilactis DRC-1, Str. lactis C-10, Str. thermophilus, Lactobacillus bulgaricus or L. acidophilus were examined for viability and activity (as % lactic acid produced in milk) after storage for 3 months at 5° or 37°C. Immediately after freeze-drying, the number of cells surviving in the 5

cultures were respectively, 21.4, 19.5, 14.5, 10.3 and 3.0%. The viability of all cultures decreased to 0-0.42% at 5° C and to 0-0.05% at 37° C after storage in gelatin capsules. The low viability is thought to be due to diffusion of moisture and/or air through the gelatin capsule. MEG

132

Dipeptide utilization by starter streptococci.
Law, B. A.
Journal of Dairy Research 44 (2) 309-317 (1977) [6 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Of 8 strains of Streptococcus cremoris tested, 5 grew almost as well in defined media in which various essential amino acids were supplied in dipeptides as in media containing the equivalent free amino acids. The remainder grew poorly or not at all in the peptide-containing media. Growth of peptide-utilizing strains was inhibited by structurally-related dipeptides in the medium, presumably due to competition for uptake by transport system carriers. Both types of starters produced cell-free dipeptidases recoverable from the medium of exponential phase cultures. Addition of partly-purified extracellular dipeptidases to dipeptide-containing test media initiated growth in strains unable to use peptides. Str. lactis grew in defined peptide media, but further addition of structurally-related dipeptides did not inhibit growth, either because each dipeptide was transported by a specific carrier or because peptides were hydrolysed extracellularly. The presence of cell-bound extracellular dipeptidase was indicated by the hydrolysis of dipeptides with washed whole cells in buffer. This was not observed with Str. cremoris strains. AS

133

Lactic acid production by Lactobacillus bulgaricus in supplemented whey ultrafiltrate.
Cox, G. C.; MacBean, R. D.
Australian Journal of Dairy Technology 32 (1) 19-22 (1977) [15 ref. En] [Gilbert Chandler Inst. of Dairy Tech., Dep. of Agric., Werribee, Victoria, Australia]

L. bulgaricus LBR was grown in continuous culture in cheese whey ultrafiltrate containing 0.1-1.8% additions of corn steep liquor (CSL) or yeast extract (YE) or 1:1 mixtures of the 2 supplements. The rate of lactic acid production significantly increased with addition of the supplements, YE being more effective on a solids basis than CSL. A mixture of the 2 supplements gave a higher acid production rate than would be predicted from each used individually. This synergistic effect was of no economic advantage in the range of supplements tested. MEG

134

[Characterization of the proteolytic activity and fractionation of the dipeptidases and aminopeptidases from Streptococcus thermophilus.]
Desmazeaud, M. J.; Juge, M.
Lait 56 (555/556) 241-260 (1976) [36 ref. Fr, en] [Lab. de Biochimie Microbienne, CNRZ, INRA, 78350 Jouy-en-Josas, France]

The proteolytic activities of 7 strains of Str. thermophilus were studied. Polyacrylamide gel electrophoresis of the soluble protein fraction of cell homogenates showed that each strain contained a leucine aminopeptidase (EC 3.4.11.1) and a prolyl dipeptidase (EC 3.4.13.8) and some strains also had an arginine aminopeptidase (EC 3.4.11.6). From results of electrophoresis of whole casein hydrolysates it was concluded that Str. thermophilus strains could hydrolyse β- and κ-caseins but not α_{s1}-casein. MEG

135

[Role of microorganisms and their enzymes in cheese ripening. III. Influence of microorganisms (Streptococcus lactis, Penicillium caseicolum and P. roqueforti).]
Desmazeaud, M. J.; Gripon, J.-C.; Bars, D. le; Bergere, J. L.
Lait 56 (557) 379-396 (1976) [38 ref. Fr, en] [Lab. de Biochimie Microbienne, CNRZ, INRA, 78350 Jouy-en-Josas, France]

The aseptic model curd, described in FSTA (1976) 8 2P402 was inoculated with Str. lactis, P. caseicolum, P. roqueforti or Str. lactis + P. caseicolum, and changes in pH and nitrogenous constituents were examined during 40 days' ripening. Str. lactis released mainly low mol. wt. peptides and amino acids; endopeptidase activity was also demonstrated by electrophoresis and gel filtration of the casein fraction. Penicillium spp. released large amounts of amino acids and low mol. wt. peptides and degraded both α_{s1}- and β-caseins. [See FSTA (1976) 8 5P870 for part II.] MEG

136

Production of bulk lactic culture concentrates for refrigerated storage and distribution. [Lecture]
Hong, G. L.; Davis, L. H.; Richardson, G. H.; Jonas, L. H.
Journal of Dairy Science 60 (suppl. 1) 38 (1977) [En] [Utah State Univ., Logan, Utah 84321, USA]

Lactic cultures were successfully propagated in 3.5% whey permeate solids containing 0.5% yeast autolysate, and harvested as a cream concentrate which was stable for 3 wk at 4° C. [See FSTA (1977) 9 11P1719.] MEG

137

[Lactic flora in Swiss Alpine cheesemaking.]
Maret, R.; Sozzi, T.
Lait 56 (555/556) 304-318 (1976) [7 ref. Fr, en] [Dep. de Developpement Tech., Soc. d'Assistance Tech. pour Produits Nestle SA, Lausanne, Switzerland]

Samples of raw milk, curd, whey, acid whey ('azi') and butter from several alpine pastures in the Valais region of Switzerland were examined for bacterial flora. This region produces a semi-hard aromatic cheese called 'fromage a raclette'. The

natural flora of the milk, whey and butter consisted mainly of Streptococcus lactis, Str. faecalis, Str. faecium, Leuconostoc cremoris, Leuc. lactis and Leuc. mesenteroides. No Lactobacillus sp. were isolated from the milk, but the 'azi' contained predominantly mesophilic lactobacilli (L. casei and L. brevis). MEG

138

Growth inhibition of Staphylococcus aureus in Cheddar cheese whey. [Lecture]
Miller, J. S.; Ledford, R. A.
Journal of Dairy Science **60** (suppl. 1) 36 (1977) [En] [Cornell Univ., Ithaca, New York 14850, USA]

Inhibition of growth of S. aureus in whey was decreased when lactic acid bacteria were removed from whey by filtration or heat treatment. Recovery of S. aureus from inoculated wheys was better on Baird-Parker medium than on Staphylococcus-110 medium. [See FSTA (1977) 9 11P1719.] MEG

139

Lactic acid production by Streptococcus lactis and Streptococcus cremoris in milk precultured with psychrotrophic bacteria.
Cousin, M. A.; Marth, E. H.
Journal of Food Protection **40** (6) 406-410 (1977) [19 ref. En] [Dep. of Food Sci., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Psychrotrophic organisms isolated from raw milk were inoculated into fresh raw milk and incubated at 7° C for 5 days. Half of each sample was autoclaved and the other half pasteurized. Str. lactis and Str. cremoris were individually inoculated into the milks and incubated at 21° C for 20 h. Acid production was measured at 2-h intervals. Lactic acid production was greater in milks pre-cultured with added psychrotrophs or the normal flora than in pasteurized control milks. In most instances, pasteurized pre-cultured milks had more acid than did autoclaved pre-cultured milk. More titratable acid was produced in autoclaved rather than pasteurized control milks. Milks with the psychrotroph and lactic streptococci added simultaneously had more titratable acid than did control milk. When cell-free filtrates of psychrotrophic cultures were used instead of cells of psychrotrophs, results resembled those obtained with the bacteria. Simultaneous inoculation of milk with lactic acid bacteria and cell-free filtrate gave results comparable with those from milks pre-cultured for 5 days with the cell-free filtrate. AS

140

[Optimum survival conditions for lactic acid bacteria in spray-dried yoghurt.]
Peri, C.; Pompei, C.
Rivista di Scienza e Tecnologia degli Alimenti e di Nutrizione Umana **6** (4) 231-236 (1976) [11 ref. It, en] [Istituto di Tecnologie Alimentari dell'Univ., Milan, Italy]

Survival of lactic acid bacteria was studied in 2 samples of yoghurt spray-dried without or with prior neutralization. Operating conditions during spray-drying ensured that product temp. was ⩽80° C and residual moisture of the powder 10%, slightly higher than for BET monolayers. Total counts decreased by 3 and 2 decimal reductions in natural and neutralized yoghurt respectively, values for protein reducing substances as an index of non-enzymic browning were 3.77 and 0.94, the N solubility index 10.46 and 70.68, microbial fermentation activity (coagulation of milk after incubation at 42° C) 8.75 and 4.84 h respectively. The results strongly supported neutralization before spray-drying. 8 months' storage tests showed highest survival at 5% RH and 5° C. In all cases dried neutralized yoghurt gave best results, even compared with a freeze-dried sample from natural yoghurt. Sorption isotherms suggested that for optimum survival neutralized yoghurt should be dried to 8-10% residual moisture content and stored in moisture-proof containers at 5° C. RM

141

The microflora of unpasteurized and pasteurized crabmeat.
Ward, D. R.; Pierson, M. D.; Tassell, K. R. van
Journal of Food Science **42** (3) 597-600, 614 (1977) [18 ref. En] [Food Sci. & Tech. Dep., Virginia Polytech. Inst. & State Univ., Blacksburg, Virginia 24061, USA]

Crabmeat is processed commercially at 85° C and held at 1.2° C to extend shelf life. Anaerobic bacteria from crabmeat were isolated, quantitated and identified using the VPI & SU anaerobic culture system. Unpasteurized crabmeat contained about 10^6-10^7 anaerobes plus facultative aerobes/g and pasteurized crabmeat contained about 10^5 anaerobes plus facultative aerobes/g. After storage for 3 months at 3.3° C, counts increased to about 10^8-10^9/g for all samples. The majority of the isolates in both unpasteurized and pasteurized crabmeat were lactic acid producing, nonsporeforming, Gram positive rods. The lactic acid producing isolates from unpasteurized crabmeat produced H_2S and grew at 37° C; however, after pasteurization, the isolates neither produced H_2S nor grew at 37° C. Heat resistance of the isolates was determined both in pH 7.20 phosphate buffer and crabmeat homogenates (pH 7.26). Decimal reduction times in phosphate buffer at 55° C were about 2.5 min for most isolates. No evidence was obtained that the isolates would survive pasteurization. IFT

142

Stability of lactic acid bacteria to freezing as relate to their fatty acid composition.
Goldberg, I.; Eschar, L.
Applied and Environmental Microbiology **33** (3) 489-496 (1977) [26 ref. En] [Inst. of Microbiol., Hebrew Univ., Hadassah Med. School, Jerusalem, Israel]

Cells of Streptococcus lactis (used in the manufacture of dairy products) and of Lactobacillu sp. A-12 (used for inducing malo-lactic

fermentation in red wines) grown in a medium supplemented with Tween 80 or oleic acid were more viable than cells grown in the absence of Tween 80 after 48 h at -17° C. From studies of the fatty acid composition of cells grown in the presence or absence of Tween 80 and of the antibiotic cerulenin, it is concluded that the sensitivity of lactic acid bacteria to damage by freezing can be correlated with specific alterations in the cellular fatty acids, such as changes in the ratio of unsaturated:saturated acids. MEG

143

Protein production by successive growth of Bacillus subtilis and Lactobacillus acidophilus on combined food wastes.
Schmidt, B. E.; Busta, F. F.; Mckay, L. L.
Journal of Food Processing and Preservation 1 (1) 13-29 (1977) [14 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St Paul, Minnesota 55108, USA]

A process was developed for simultaneous utilization of several food wastes and production of single cell protein by successive growth of B. subtilis and L. acidophilus. A collagen-derived substrate, starch, and cheese whey represented food wastes. Growth of B. subtilis on combined wastes yielded a biomass of 3.6 g/l. and significantly modified the medium. Other bacilli also had similar potential for altering the original material. After fortification with cheese whey, the modified medium was used for growth of L. acidophilus as a 2nd-stage biomass production. Optimal growth conditions were determined. The feasibility of the process will be dependent upon increasing L. acidophilus biomass yields. AS

144

Lactobacillus acidophilus utilization of sugars and production of a fermented soybean product.
Stern, N. J.; Hesseltine, C. W.; Wang, H. L.; Konishi, F.
Canadian Institute of Food Science and Technology Journal 10 (3) 197-200 (1977) [12 ref. En, fr] [N. Regional Res. Lab., USDA, Peoria, Illinois 61604, USA]

8 strains of Lactobacillus acidophilus, obtained from the ARS Culture Collection, were tested for their ability to use monosaccharides (fructose, galactose, glucose and D(+)mannose), disaccharides (lactose, maltose and sucrose) and 2 oligosaccharides (raffinose and stachyose). As judged by titratable acidity and pH changes during growth, strain variation existed in the ability of the microorganisms to utilize the sugars. Strain NRRL B-1910 was a superior utilizer of raffinose and stachyose as measured by medium pH changes. Therefore, B-1910 was selected as inoculum for the successful production of a yoghurt-like soybean product, which has potential as a good protein food source. AS

145

Effects of glucosyl pantothenates on the growth of beer lactic acid bacteria.
Eto, M.; Nakagawa, A.
Bulletin of Brewing Science 20, 37-39 (1974) [10 ref. En] [Cent. Res. Lab., Asahi Breweries Ltd., Ohta-ku, Tokyo 143, Japan]

The stimulating effects of α- and β-glucosides of D-pantothenic acid and of calcium pantothenate on the growth of 11 strains of beer lactic acid bacteria (4 strains of Pediococcus cerevisiae, 3 of P. damnosus and 4 of hop tolerant Lactobacilli (L. brevis)) were studied. Results, shown graphically and in a table, revealed that calcium pantothenate promoted the growth of all strains except P. cerevisiae L-73, which specifically required the β-glucoside. The β-glucoside (1000 μg/l.) supported good growth of most Pediococcus strains (except P. damnosus M-1) but none of the Lactobacillus strains. The α-glucoside did not promote the growth of any of the 11 strains. 200 μg/l. calcium pantothenate supported max. growth of the Pediococcus strains (except P. damnosus M-1). RM

146

[Studies on formation, purification and properties of glucose isomerase from Streptococcus bikiniensis.] Studien über Bildung, Reinigung und Eigenschaften von Glucoseisomerase aus Streptococcus bikiniensis.
Park, Y. K.
Zeitschrift für die Zuckerindustrie 27 (6) 372-374 (1977) [De, en, es, fr] [Univ. Estadual de Campinas, Fac. de Tecnologia de Alimentos, Campinas, S.P., Brazil]

Out of 650 strains of soil microorganisms, a strain of Streptococcus bikiniensis was isolated which produces an intracellular glucose isomerase of high activity. Its characteristics were studied in a cell-free purified extract and in the bound form as a freeze-dried powder. The optimal activity conditions are at pH 8-9 and 80° C (for purified enzyme); 10% glucose concn. achieves the highest fructose yield i.e. 50% conversion at 70° C. Mg^{2+} and Co^{2+} (5.0 and 0.5mM) in combination enhanced the heat tolerance and activity, and inhibited heat denaturation. Under optimum conditions, the formation of D-psicose (an undesirable by-product) was considerably reduced. The isomerization of D-xylose, D-ribose and D-glucose was completely inhibited by D-sorbitol. The enzyme has a higher affinity for xylose than for glucose (relative isomerization 100% for xylose, 70% for ribose, 60% for glucose). For practical industrial purposes the production of isomerose syrup with the cell-bound enzyme allows its separation and reuse, albeit at reduced activity. RM

147

Incidence and properties of temperate bacteriophages induced from lactic streptococci.
Huggins, A. R.; Sandine, W. E.
Applied and Environmental Microbiology **33** (1) 184-191 (1977) [31 ref. En] [Dep. of Microbiol., Oregon State Univ., Corvallis, Oregon 97331, USA]

63 strains of lactic streptococci isolated from commercial starter cultures were examined for lysogeny by treatment with UV light or mitomycin C, and all strains, whether or not they lysed, were examined for evidence of phage release by electron microscopy. 38 strains yielded intact phages or phage particles of varying morphology. All the temperate phages had isometric heads and noncontractile tails; some had collars and structurally distinctive baseplates. Indicator host strains were found for phages induced from 7 different strains. 3 strains that released phages spontaneously yielded titres of 10^3-10^4 plaque-forming units/ml. When strains that spontaneously released phages were grown in mixed culture with indicator strains, increased phage titres of 10^6-10^7 plaque-forming units/ml were observed. These findings indicate that lysogenic lactic streptococcal strains may serve as a reservoir for phages that attack sensitive strains in mixed- or multiple-strain lactic starter cultures. MEG

148

Lactic bulk culture system utilizing whey-based bacteriophage inhibitory medium and pH control. II. Reduction of phosphate requirements under pH control.
Ausavanodom, N.; White, R. S.; Young, G.; Richardson, G. H.
Journal of Dairy Science **60** (8) 1245-1251 (1977) [12 ref. En] [Dep. of Nutr. & Food Sci., Utah State Univ., Logan, Utah 84322, USA]

Reduction of added phosphates in a bacteriophage inhibitory whey-based medium was possible through the application of pH control. 35 active lactic strains and homologous bacteriophage filtrates were inoculated into whey media containing 0-2% added phosphates, and continuously neutralized to pH 6 with 20% ammonium hydroxide. At 0% phosphates, all but 5 strains lysed; however, improved growth of these was evident in the media containing added phosphates. 21 strains were protected by 0.5%, 30 by 0.75%, 34 by 1%, and all 35 by 2% added phosphates. All strains performed better in the whey-based medium than in a commercial bacteriophage inhibitory medium under pH control. Acid production was faster in bacteriophage-challenged cultures with reduced phosphate. Storage of a dehydrated bacteriophage inhibitory medium for 2 yr did not affect propagation characteristics of lactic culture. Examples of individual strain responses to the different phosphate contents are reported. Reduced phosphate enhanced milk clotting time, allowed faster culture development, provided protection against bacteriophage, and reduced phosphate content in finished products. [See FSTA (1977) 9 8P1271 for part I, and following abstr. for part III.] AS

149

Lactic bulk culture system utilizing whey-based bacteriophage inhibitory medium and pH control. III. Applicability to Cottage cheese manufacture.
Chen, Y. L.; Richardson, G. H.
Journal of Dairy Science **60** (8) 1252-1255 (1977) [11 ref. En] [Dep. of Nutr. & Food Sci., Utah State Univ., Logan, Utah 84322, USA]

A phosphated whey medium prepared from fresh Cottage cheese whey was as effective as phosphated whey media prepared from Swiss cheese whey in supporting development of lactic cultures. Activity of cultures in the phosphated acid whey medium with control of pH at 6 was higher than in commercial phage inhibitory media or reconstituted skim-milk without pH control. Cultures propagated in the acid whey medium were used successfully to manufacture Cottage cheese. Acid production in the vat was faster and more reliable, and cutting times were shorter than when a conventional medium was used, but the products were comparable. Approx. 80% of the lactose in the culture was consumed compared to 9% in a phosphated acid whey medium not under pH control. [See preceding abstr. for part II.] AS

150

Lacstrepcin - a bacteriocin produced by Streptococcus lactis.
Kozak, W.; Bardowski, J.; Dobrzanski, W. T.
Bulletin de l'Academie Polonaise des Sciences, Sciences Biologiques **25** (4) 217-221 (1977) [12 ref. En, ru] [Zaklad Mikrobiol. Farmaceutycznej, Akad. Med., Warsaw, Poland]

The production of bacteriocins by lactic streptococci has not yet been reported. In this investigation, Streptococcus lactis 10, which does not produce the antibiotic nisin, has been found to produce a bacterocin killing the cells of certain lactic streptococci, Str. pyogenes and Lactobacillus strains. The bacteriocin is sensitive to proteolytic enzymes and phospholipase D but is resistant to fungal amylase, does not dialyse, is precipitated with 50% $(NH_4)_2SO_4$, does not sediment during ultracentrifugation, is active at pH 4.2-6.0, and is reversibly inactivated at pH 7.0 and 8.0. The name suggested for this bacteriocin is lacstrepcin. Studies on other bacteriocins of the lactic streptococci are in progress. AS

151

Lactic acid inhibition of Salmonella typhimurium in yoghurt.
Rubin, H. E.
Dissertation Abstracts International, B **37** (10) 4894: Order No. 77-8020 (1977) [En] [Univ. of Michigan, Ann Arbor, Michigan 48104, USA]

Yoghurt, fermented for 18 h, contained 0.158 M lactic acid and 3.7mM acetic acid and had a pH of 3.85 and an oxidation-reduction potential of -80 mV. Intracellular dissociated lactic acid was shown to be the main factor responsible for inhibiting growth of S. typhimurium in yoghurt. MEG

152

A multiple starter concept for cheesemaking.
Limsowtin, G. K. Y.; Heap, H. A.; Lawrence, R. C.
New Zealand Journal of Dairy Science and Technology **12** (2) 101-106 (1977) [7 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

A multiple starter MS-1, consisting of 6 Streptococcus cremoris strains, was used continuously for 8 months in 1 dairy factory. A modification of this starter (MS-2), in which 1 Str. cremoris strain was replaced by a Str. lactis strain, was used equally successfully in 2 other dairy factories for 2 and 5 months respectively. In all 3 factories, starter activity was consistent and was not significantly affected by seasonal changes in raw milk or by the presence of relatively high levels of phage. A smaller inoculum of MS-1 or MS-2 in the cheese vat is required than with paired starters. It is concluded that when multiple starters are used, the ratio of temp.-sensitive:temp.-insensitive strains should be 2:1 to ensure good flavour in the mature cheese. Inclusion of Str. lactis in MS-2 gave the required activity after salting, without producing off-flavours. MEG

153

[Study and selection of bacteriophage-resistant pure cultures for industrial milk processing.]
Svigar-Varga, S.; Krsev, L.
Mljekarstvo 27 (5) 109-116; (6) 126-132 (1977) [15 ref. Sh] [ZM Mljekarsko Produzece 'Dukat', Zagreb, Yugoslavia]

12 strains of mesophilic streptococci, components of cultured milk and cream starters in the Zagreb dairy and consisting of 8 strains of Str. lactis, 3 of Str. cremoris and 1 of Str. diacetilactis were tested for resistance to 3 local strains of bacteriophage. The results are presented and discussed in detail with the view to developing bacteriophage-resistant starters for industrial application. SKK

154

Lactic acid production by Streptococcus thermophilus and Lactobacillus bulgaricus in milk precultured with psychrotrophic bacteria.
Cousin, M. A.; Marth, E. H.
Journal of Food Protection 40 (7) 475-479 (1977) [11 ref. En] [Dep. of Food Sci., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Raw milk was incubated at 7° C for 5 days after it was inoculated with psychrotrophic bacteria previously isolated from other raw milks. A portion of each sample of milk was pasteurized and the remainder autoclaved. Str. thermophilus and L. bulgaricus were individually inoculated into all pasteurized and autoclaved milks which were than incubated at 37° C, and titratable acidity was measured at 2-h intervals. Pasteurized milks precultured with psychrotrophic bacteria supported more acid production than did pasteurized control milks. Str. thermophilus and especially L. bulgaricus produced more acid in autoclaved than in pasteurized milks. Cell-free filtrates from cultures of psychrotrophic bacteria were added to raw, pasteurized, and autoclaved milks before they were inoculated with the lactic acid bacteria. Results were similar to those obtained when psychrotrophic bacteria were added to milk. When the cell-free filtrate was added to milks simultaneously with starter cultures, < 10 h were required to produce conditions in milk favourable for enhanced lactic acid production. AS

155

Strain dominance in frozen multiple strain lactic starters.
Leach, R. D.
Dissertation Abstracts International, B 37 (4) 1560-1561: Order No. 76-23526 (1976) [En] [Oregon State Univ., Corvallis, Oregon 97331, USA]

Single strain components of 2 multiple strain lactic streptococcal starters were concentrated and frozen. At 30-day intervals, they were thawed and examined for survival, sensitivity to phages and lactate, and for acid and antibiotic production. Results showed that dominance of certain strains could be attributed to their high survival after freezing, to growth stimulation by peptides supplied by proteolytic enzymes from the other starter components, or to a high salt tolerance. No single factor could be identified as the cause of strain dominance, but phage sensitivity is suggested as a good indicator. MEG

156

[Continuous lactic acid fermentation in the manufacture of cultured milk products.]
Nepreryvnoe molochnokisloe brozhenie v proizvodstve kislomolochnykh produktov. [Book]
Patkul', G. M.; Lyshcheva, L. A.; Kudryavtseva, T. A.
52pp. (1976) [53 ref. Ru] Moscow, USSR; Pishchevaya Promyshlennost'. Price 0.18r

Much attention is paid to application of the continuous lactic acid fermentation process during the production of tvorog. It is emphasized that continuous lactic acid fermentation process may be economical only at large, fully mechanized and automated dairy plants. The following chapters are included: Principles of continuous microorganisms cultivation (pp. 5-11); Continuous cultivation of lactic acid bacteria (pp. 11-15); Machinery used for continuous lactic acid fermentation (pp. 15-19); Factors affecting continuous lactic acid fermentation (pp. 19-42); and Application of continuous lactic acid fermentation in the manufacture of tvorog (pp. 42-50). STI

157

[Studies on the promotion of cheese ripening. II. Influence of the kind of bacteria on the ripening of cheese.]
Chikuma, G.; Yoshino, M.; Furukawa, S.
Bulletin of National Institute of Animal Industry [Chikusan Shikenjo Kenkyu Hokoku] No. 31, 1-8 (1976) [13 ref. Ja, en]

Cheeses made with and without various lactic acid bacteria were tested for N components throughout ripening. In cheese made without starter, the bacterial count increased from 10^5/g initially to 10^7-10^8/g on day 120 and thereafter showed no marked change; cheeses made with lactobacilli (Lactobacillus casei, L. plantarum or L. helveticus) showed a decrease in bacterial count from 10^9-10^{10}/g immediately after production to about 10^8/g on day 180, whilst those made with Hansen's lactic culture (streptococci) showed a corresponding increase from 10^3-10^4/g to 10^7-10^8/g. Content of various N compounds increased in all cheeses during ripening. Cheese made with lactic acid bacteria contained more proteose and amino N than peptone N, whilst those made without starter showed the reverse. Results obtained with lactobacilli differed little from those obtained with streptococcal starter. [From En summ.] CDP

158

[Microbial flora of Manchego cheese. III. Streptococci.]
Martinez-Moreno, J. L.
Anales del Instituto Nacional de Investigaciones Agrarias Serie General No. 4, 41-56 (1976) [25 ref. Es, en] [CRIDA 06 (Tajo), INIA, Avenida de Puerta de Hierro s/n, Madrid-3, Spain]

Lactic streptococci and enterococci were isolated from raw ewes' milk and 10 farm-produced Manchego cheeses on Turner agar, Neutral red chalk lactose agar and KF streptococcus agar. Turner agar was the most effective isolation medium. 98.4% of 188 lactic streptococci isolated belonged to Streptococcus lactis and 1.6% to Str. lactis subsp. diacetylactis. Of 158 strains of enterococci isolated, Str. durans was dominant in nearly all the cheeses; Str. faecium was isolated from all cheeses and Str. faecalis from only 2 cheeses. The Str. lactis strains studied were mainly slow acid-producers and developed weak proteolytic activity towards high mol. wt. N fractions producing short peptides and amino acids. Most of the products of proteolysis were transformed into bacterial proteins. None of the streptococci showed lipolytic activity towards milk lipids but were active towards tributyrin. Lipolytic activity of Str. lactis (but not of enterococci) was reduced at pH 5.0. Growth of the strains of streptococci studied was inhibited at pH 5.0 or by 5.0% NaCl. [See also preceding and following abstr.] AS

159

[Microbial flora of Manchego cheese. IV. Lactobacilli.]
Nunez, M.
Anales del Instituto Nacional de Investigaciones Agrarias Serie General No. 4, 57-65 (1976) [29 ref. Es, en] [CRIDA 06 (Tajo), INIA, Avenida de Puerta de Hierro s/n, Madrid-3, Spain]

296 strains of lactobacilli were isolated from 14 Spanish Manchego cheeses at different stages of ripening. They were identified as follows: 134 Lactobacillus casei (129 subsp. casei, 3 subsp. rhamnosus, 1 subsp. alactosus, 1 subsp. tolerans), 148 L. plantarum, 5 L. brevis, 3 L. cellobiosus, 3 L. fermentum and 3 L. lactis. Higher tolerance to 5% NaCl and pH 5.0 observed in L. casei and L. plantarum might explain their preponderance. The 6 isolated species showed weak proteolytic and lipolytic activities, L. casei and L. plantarum produced the highest % of diacetyl-producing strains. These 2 species are the most important in ripening of Manchego cheese due to their numbers and properties. [See also preceding and following abstr.] AS

160

[Microbial flora of Manchego cheese. V. Leuconostocs.]
Nunez, M.
Anales del Instituto Nacional de Investigaciones Agrarias Serie General No. 4, 67-74 (1976) [17 ref. Es, en] [CRIDA 06 (Tajo), INIA, Avenida de Puerta de Hierro s/n, Madrid-3, Spain]

193 Leuconostoc strains were isolated during ripening of 14 Spanish Manchego cheeses. 82 were identified as Leuconostoc dextranicum, 80 as L. paramesenteroides, 21 as L. mesenteroides, 6 as L. lactis and 4 as L. cremoris. They were weak acid producers in milk, showed low proteolytic and lipolytic activity, and were not seriously affected by 5% NaCl and initial pH 5.0 in MRS broth. One strain of L. lactis was a diacetyl producer. [See also preceding and following abstr.] AS

161

[Microbial flora of Manchego cheese. VI. Pediococci.]
Nunez, M.
Anales del Instituto Nacional de Investigaciones Agrarias Serie General No. 4, 75-81 (1976) [18 ref. Es, en] [CRIDA 06 (Tajo), INIA, Avenida de Puerta de Hierro s/n, Madrid-3, Spain]

21 pediococcus strains were isolated throughout the ripening of 14 Spanish Manchego cheeses. All were identified as Pediococcus pentosaceus. They were seriously affected by 5% NaCl, which could explain why they are found more rarely than lactobacilli and leuconostocs. They were weak acid producers in milk and showed weak proteolytic and lipolytic activity. 14 of the isolated strains produced diacetyl from glucose. [See also preceding and following abstr.] AS

162

The effect of garlic extract on lactic acid bacteria (Lactobacillus plantarum) in culture media.

Karaioannoglou, P. G.; Mantis, A. J.; Panetsos, A. G.

Lebensmittel-Wissenschaft und -Technologie 10 (3) 148-150 (1977) [9 ref. En] [Dep. of Food Hygiene, Fac. of Vet. Med., Aristotelian Univ., Thessaloniki, Greece]

The growth of L. plantarum in BHI broth containing 0, 1, 2, or 5% garlic extract was studied under both favourable (30° C/pH 6.6) and adverse 37° C/pH 7.4) conditions by means of optical density measurements and by plating on APT agar. Garlic extract concn. > 1% were definitely inhibitory, while at the 1% level its effects might be partially counteracted by the use of favourable conditions of pH and temp. and large inocula (> 10^6 cells/ml). These effects are relevant to the production of dry or semi dry sausages of the Karamanlidka type (containing ≤ 5% garlic), when L. plantarum is employed as a starter culture. BDH

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FAB 31

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H. BROOKES

ASSISTANT EDITOR

1

[Growth promoting substances for hiochi bacteria in grain kernels. I. Mevalonic acid and other growth promoting factors in rice kernels.]
Otsuka, K.; Ito, M.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] **72** (1) 47-52 (1977) [7 ref. Ja, en] [Nat. Res. Inst. of Brewing, Kita-ku, Tokyo, Japan]

A growth promoting factor for hiochi bacteria was found in a methanol-extract of rice bran obtained with polishing yields of 80-90%. The extract was fractionated into 2 parts, RFAS-I and RFAS-II, by chromatography on alumina and silica gel. An active factor in the RFAS-I was identified as mevalonic acid. The RFAS-II was further fractionated into 2 parts by silica gel TLC; one part was positive in the hydroxamate and vanillin-H_2SO_4 reactions, the other was positive in the diazotized sulphonate reaction. These substances had a stimulatory effect on Lactobacillus similar to that of mevalonic acid. [See following abstr. for part II.] YN

2

[Growth promoting substances for hiochi bacteria in grain kernels. II. Separation of mevalonic acid and other growth promoting factors in barley.]
Otsuka, K.; Ito, M.; Yamamoto, H.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] **72** (1) 53-57 (1977) [2 ref. Ja, en] [Nat. Res. Inst. of Brewing, Kita-ku, Tokyo, Japan]

Growth promoting substance for Lactobacillus (hiochi bacteria) were extracted from barley kernels and fractionated by column chromatography on various resins. The fractions were divided into 2 parts, BFAS-I and BFAS-II, by silica gel chromatography. An active factor in BFAS-I was identified as mevalonic acid. The BFAS-II was further fractionated into 2 parts by paper chromatography; one part was positive in the hydroxamate reaction and the other was a phenolic substance. BFAS-II had a similar growth promoting activity for Lactobacillus as mevalonic acid. [See preceding abstr. for part I.] YN

3

[Lactic fermentation in brewing, with reference to dietetic aspects.] Die Milchsäuregärung als Diätfaktor der Biererzeugung.
Kretschmer, K. F.
Tageszeitung für Brauerei **74** (39) 125-126 (1977) [9 ref. De]

Lactic-fermented beers are discussed, with special reference to Bantu millet beer, Tibetan 'Chang' beer, German 'Weisse' and wheat beers, and Belgian Trappist beers. The manufacture, nutritional value and organoleptic properties of these beers are briefly considered. AJDW

4

[Acidity reduction activity of some microorganisms.]
Smirnov, V. I.; Dement'ev, G. S.; Mel'nichuk, P. T.
Sadovodstvo, Vinogradarstvo i Vinodelie Moldavii **32** (2) 34-37 (1977) [Ru] [NPO 'Yaloveny', Kishinev, USSR]

Biological reduction of acidity may be produced by some of the lactic bacteria and also some yeasts. Their action on Rhine Riesling was studied; testing procedures and methodology are presented. The pH and titratable acidity values are tabulated. 5 types of Leuconostoc bacteria produced a reduction of titratable acidity; highest activity was that of Leuconostoc citrovorum 11. STI

5

[The effect of steamed flour oj the vital processes of the lactic fermentation bacteria present in wheat ferments.]
Vitavskaya, A. V.; El'tsova, O. P.; Lukanova, L. N.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 2, 23-24 (1977) [Ru] [Kazgipropishcheprom, USSR]

The effect of the components in steamed flour on the vital processes of the lactic souring bacteria, and on the quality of ferments produced from grade I and II wheat flour was studied. The lactic bacteria were cultivated on a flour medium with 10 or 50% addition of steamed flour, and on 100% steamed flour medium. A pure culture of Lactobacillus fermenti-27 was inoculated and cultivated at 35-37°C for 24 h. It was found that a cultivation medium for the mesophilic L. fermenti-27 can be made without the steamed flour addition; better quality is imparted to the ferment by cultivation on grade II flour and the ferment and bread quality are not impaired by the absence of steamed flour. The ability of the bacteria to prevent ropiness is not affected by the content of steamed flour in the medium. STI

6

[Properties of lactic bacteria used in bread-making.]
Rakhmankulova, R. G.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 2, 21-23 (1977) [Ru] [Moskovskii Ordena Trudovogo Krasnogo Znameni Tekh. Inst. Pishchevoi Promyshlennosti, Moscow, USSR]

The microflora of rye flour dough was studied. Regardless of a high microbial contamination of the flour the basic microflora of rye dough was Lactobacillus plantarum, L. casei, L. brevis and L. fermenti. The antagonistic character of the lactic bacteria in relation to the remaining microflora is due to the ability of Lactobacilli to produce organic acids and a certain amount of antibiotic materials. The lactic acid is a specially important factor in the system as it produces a favourable medium for the action of the antibiotic substances. Knowledge of the production by lactic souring bacteria of organic acids and antibiotic substances is highly important in practice, in particular for the accelerated methods of dough-making. STI

7

[The effect of temperature on the quality of a [sour dough] fermentation liquid.]
Kazanskaya, L. N.; Gurina, O. F.; Afanas'eva, O. V.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 2, 25 (1977) [Ru] [Leningradskoe Otdelenie Vses. Nauchno-issled. Inst. Khlebopekarnoi Promyshlennosti, Leningrad, USSR]

The effect of temp. was studied on the yeasts and lactic bacteria present in fermentation liquid made from rye flour with a pure lactic bacteria culture and yeasts. The optimal temp. of a liquid with 70-75% moisture, without steamed flour addition, is 29-30° C. Increasing the initial temp. to 32° C, and in particular to 33-34° C, stimulates development of the lactic bacteria and inhibits yeast growth, whereby the fermenting ability is impaired and souring of the liquid is accelerated. Below 30° C the dominant Lactobacilli are L. plantarum and L. brevis; at 34-36° C dominant spp. are L. casei and L. fermenti; at 30-32° C the ratio of the 2 groups becomes balanced. For liquids with 80% moisture and with a steamed flour addition a successful technique is to keep the initial temp. of fermentation at 31-32° C. Control of the optimal temp. is a major prerequisite for stabilizing the product quality. STI

8

Natural antibiotic activity of Lactobacillus acidophilus and bulgaricus. II. Isolation of acidophilin from L. acidophilus.
Shahani, K. M.; Vakil, J. R.; Kilara, A.
Cultured Dairy Products Journal 12 (2) 8-11 (1977) [18 ref. En] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska 68583, USA]

Skim-milk cultures of L. acidophilus were tested for inhibitory activity by agar diffusion with Pseudomonas fluorescens as test organism [see part I, FSTA (1977) 9 5P769]. Those containing >0.05 units acidophilin/mg DM were purified by freeze-drying, extraction of the residue with methanol and then acetone, and concentration under reduced pressure; the final concentrate (made up to 100 ml with distilled water) was further purified by either Sephadex G-50 column or silica gel chromatography, and then by TLC on silica gel plates. The final yield of acidophilin was 4.5% of the original acidophilus milk dry wt., and specific activity was 19 units/mg, equivalent to a 247-fold purification. In tests against 27 bacterial sp. the concn. of acidophilin required to cause 50% inhibition ranged from 29 µg/ml for Bacillus cereus to 60 µg/ml for L. plantarum, Ps. aeruginosa, Staphylococcus aureus and Klebsiella pneumoniae. CDP

9

Major savings realized in the production of bulk lactic culture with whey-based phage inhibitory medium provided with pH control.
Jonas, L. L.; Ernstrom, C. A.; Richardson, G. H.
Cultured Dairy Products Journal 12 (2) 12-14 (1977) [5 ref. En] [Cache Valley Dairy Ass., Amalga, Utah, USA]

10

[Changes in some bacteriological and biochemical activities in yoghurt starters during seven hours of incubation.]
Abrahamsen, R. K.
Meieriposten 68 (18) 603-611; (19) 639-646 (1977) [46 ref. No, en]

During 7 h incubation at 42° C, the proportion of Streptococcus thermophilus in 5 yoghurt starters from Danish laboratories (3 from Hansen's, 1 from Visby and 1 from Flora Danica) increased for the first 2 h, then decreased in the next 2 h to give a good Str. thermophilus/Lactobacillus bulgaricus ratio between 1:1 and 2:1. The number of cells/bacterial chain was relatively high in the first 1-1½ h of incubation, fell rapidly in the next 3-4 h, then remained constant. The relative protein titre (as % of the initial titre in milk, determined by formol titration) decreased in the first 2½ h but then changed little. Acetaldehyde production varied among the starters, rising throughout the incubation period to a max. of 19-22.5 ppm after 7 h. Acetoin rose rapidly to 26-54 ppm in the first 3 h, then changed little. CO_2 production varied widely among the starters, ranging from 360 µl (Hansen's B3 starter) to 570 µl (Visby V1 starter) after almost 4 h. ADL

11

The serological differentiation of lactic streptococcal bacteriophage.
Jarvis, A. W.
New Zealand Journal of Dairy Science and Technology 12 (3) 176-181 (1977) [12 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

12

The behaviour of different starter cultures during the manufacture of yoghurt from hydrolysed milk.
Tamime, A. Y.
Dairy Industries International 42 (8) 7-11 (1977) [16 ref. En, fr, de, es]

'Normal' (CH-1), 'viscous' (Boll-3) and 'slime-producing' (RR) starters (3:1 Streptococcus thermophilus/Lactobacillus bulgaricus ratio) were inoculated at 2% into (i) non-hydrolysed, (ii) 50% lactase-hydrolysed and (iii) 100% lactase-hydrolysed milk, and incubated for 6 h at 42° C. All 3 starters showed optimum activity in (ii) containing lactose, glucose and galactose; activity of CH-1 and Boll-3 was lowest in (i), containing lactose only, and that of RR was lowest in (iii), containing glucose and galactose. All starters produced yoghurt of good consistency irrespective of type of milk, and all showed similar patterns of carbohydrate utilization in (i). Changes in Str. thermophilus/L. bulgaricus ratio during incubation were similar for all 3 starters; ratios were about 6:1, 19:1 and 6:1 in (i), (ii) and (iii) resp. after 1-2 h, and reached 1:1 after 5

h in (i) and (ii), but in (iii) ratios after 6 h were 1.6:1 for CH-1, 1.5:1 for Boll-3 and 2.3:1 for RR. Total cell counts of all 3 starters after 4 h were highest in (ii) and lowest in (i). Results are discussed in relation to lactose, glucose and galactose utilization. CDP

13

Effect of lactic acid addition on Domiati cheese.
El-Koussy, L. A.; Nasr, M. A.; Hamdy, A. M.; Abdel-Ghani, O.
Agricultural Research Review 53 (7) 125-130 (1975) [10 ref. En] [Anim. Production Res. Inst., Cairo, Egypt]

Pure lactic acid was added to milk to raise the acidity to 0.17, 0.18, 0.19 or 0.20% before using it to make Domiati cheese. Fresh yield was decreased by higher acidity, but the rate of loss of yield during pickling was unaffected. Moisture and fat contents, and cheese acidity were not influenced by the original acidity of the milk. The best flavour, body and texture was obtained using milk of the lowest acidity. The high acidity milks produced cheeses whose flavour deteriorated during pickling. JRR

14

Mesophilic lactobacilli as a cause of nitrate reduction in Gouda cheese.
Nieuwenhof, F. F. J.
Netherlands Milk and Dairy Journal 31 (3) 153-162 (1977) [11 ref. En] [Netherlands Inst. for Dairy Res. (NIZO), Ede, Netherlands]

Gouda cheeses were made from pasteurized (72° C for 10 s) milk supplemented with 25 ml saturated $CaCl_2$ solution, 22 ml rennet and 20 g KNO_3/100 l. milk and using 1% BD starter Ur. 18 strains of Lactobacillus casei (isolated from cheese) and 1 of L. coryniformis subsp. coryniformis 33 were examined for their ability to reduce nitrate during cheese ripening. The strains were added individually or in mixtures to the cheese milk. L. coryniformis and 2 strains of L. casei were able to reduce all added nitrate within 6 wk. The nitrate reducing ability of these strains was also demonstrated using freeze-dried sterile cheese as a medium. The presence of nitrate-reducing lactobacilli as a cause of butyric acid fermentation in cheese is discussed. MEG

15

Method of production and recovery of protein from food wastes.
Busta, F. F.; Schmidt, B. E.; McKay, L. L. (United States of America, Regents of the University of Minnesota)
United States Patent 4 018 650 (1977) [En]

A method for the 2-stage production of single cell protein for use as an animal feed and food supplement consists of: preparing a liquid medium from combined food wastes (protein plus carbohydrate); inoculating the medium with a species of Bacillus, e.g. B. subtilis and maintaining it under conditions favourable to microbial growth in order to produce a modified medium; inoculating the modified medium with a species of Lactobacillus, e.g. L. acidophilus and maintaining the modified medium under conditions favourable to the growth of this species; and recovering the resultant protein. The modified medium may be fortified by the addition of other food wastes, e.g. cheese whey. EJM

16

Isolation and characterization of malo-lactic bacteria from Israeli red wines.
Chalfan, Y.; Goldberg, I.; Mateles, R. I.
Journal of Food Science 42 (4) 939-943, 968 (1977) [36 ref. En] [Lab. of Applied Microbiol., Hebrew Univ.-Hadassah Med. School, PO Box 1172, Jerusalem, Israel]

10 cultures of malic acid-decomposing bacteria were isolated from Carignan and Cabernet Sauvignon red wines that underwent spontaneous malo-lactic fermentation. The bacteria were characterized with respect to their physiological and biochemical properties and compared to other known malo-lactic bacteria. 6 strains were classified as belonging to the genus Lactobacillus, including 2 strains of L. plantarum, 2 strains of L. brevis and 2 strains of unidentified Streptobacterium spp. 4 strains were classified as belonging to the genus Leuconostoc including 3 strains of Leuconostoc oenos and 1 strain of Leuconostoc dextranicum. 4 isolates of these cultures as well as Leuconostoc oenos ML-34 were used in experiments in which malo-lactic fermentation was induced in Carignan wine. The resultant wines were subjected to sensory evaluation by an expert; the results indicated that malo-lactic fermentation did not reduce the quality of the Israeli Carignan red wine having a high pH and low total acidity. Indeed, if it was carried out with chosen inocula it could apparently improve the wine significantly. IFT

17

[Bacteria affecting acidity reduction in highly acid wines.]
Rabinovich, Z. D.
Sadovodstvo, Vinogradarstvo i Vinodelie Moldavii 32 (6) 32-34 (1977) [2 ref. Ru] [VNIIViV 'Magarach', Yalta, USSR]

The effect was studied of pH and tartaric and malic acid contents in the wine on the development of lactic acid bacteria able to reduce the wine's acidity due to malo-lactic fermentation. It was established that most important organisms for acidity reduction of very acid wine were heteroenzymic cocci of the Leuconostoc genus, which cause malo-lactic fermentation at a titratable acidity >11 g/l., tartaric acid content >5 g/l. and pH <2.9. Homo- and heteroenzymic rods also multiplied, causing malo-lactic fermentation at a lower acidity and considerably higher pH, when the heteroenzymic cocci were also active. The best method for inducing malo-lactic fermentation was the addition of pure cultures to the fermenting must, or to the must near the end of the fermentation process. STI

18

[Mutants of thermophilic lactic acid bacteria used in liquid yeast manufacture.]
Kalinina, V. I.; Bogatyreva, T. G.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 6, 39-41 (1977) [Ru] [Vses. Nauchno-issled. Inst. Khlebopekarnoi Promyshlennosti, USSR]

Mutants of Lactobacillus delbrückii possess a high capacity for formation of aldehydes and diacetyl. The best results obtain if strains cultivated on sodium citrate are repeatedly irradiated with UV rays. Biochemical tests showed that the first-irradiation mutants had a high lactic acid content (1.2-1.3%), the second-irradiation mutants having substantially less lactic acid (0.9-1.12%), with, however, a considerable increase in aldehydes. The second irradiation was shown to be responsible for promoting the capacity to synthesize aromatic substances. The first- and second-irradiation strains were used as a medium for liquid yeast manufacture, in conjunction with 'Moskovskii-23' yeast strain. Single and combined cultures were tested. The liquid yeast produced using second-irradiation mutants had a higher fermenting power. This was particularly evident in the mixed cultures. STI

19

[Selection of lactic acid bacteria and their utilization in the dairy industry.] Selektsiya molochnokislykh bakterii i ikh primenenie v molochnoi promyshlennosti. [Book]
Bannikova, L. A.
255pp. (1975) [351 ref. Ru] Moscow, USSR; Pishchevaya Promyshlennost' Price 1.60r

The book includes the following chapters: Lactic acid bacteria identification and their desirable properties (pp. 10-42); Lactic acid bacteria selection from natural sources (pp. 42-64); Study into changes of lactic acid bacteria (pp. 64-89); Production of technologically desirable strains of lactic acid bacteria by means of mutation and adaptation (pp. 89-114); Combination of lactic acid bacteria (starters) (pp. 114-130); Storage of technologically desirable lactic acid bacteria cultures and their combinations (pp. 130-147); Production of bacterial concentrates (pp. 148-161); Liquid starters (pp. 161-170); Dry starters (pp. 170-200); Production of frozen bacterial concentrates (pp. 200-215); and Methods of lactic acid bacteria investigation (pp. 221-242). STI

20

Instability of Lactobacillus acidophilus in yoghurt.
Gilliland, S. E.; Speck, M. L.
Journal of Dairy Science 60 (9) 1394-1398 (1977) [11 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

L. acidophilus, added to yoghurt, decreased in numbers during refrigerated storage (5° C) for 7 days. H_2O_2 produced by L. bulgaricus during manufacture of the yoghurt appeared to be the main cause of this decrease, since the addition of catalase greatly reduced the antagonistic effect of the yoghurt. Results indicate that yoghurt is not a desirable medium for suspending L. acidophilus to serve as a dietary adjuvant. MEG

21

Casein degradation and amino acid liberation in milk by two highly proteolytic strains of lactic acid bacteria.
Chebbi, N. B.; Chander, H.; Ranganathan, B.
Acta Microbiologica Polonica 9 (3) 281-284 (1977) [9 ref. En] [Div. of Dairy Bact., Nat. Dairy Res. Inst., Karnal, Haryana, India]

Lactobacillus bulgaricus and Streptococcus faecalis were inoculated into whey containing 2.5% casein, and incubated for 14 days at 37° C. Analysis of casein by starch gel electrophoresis showed that both organisms degraded κ-casein, whereas β-casein was resistant to proteolysis. α_s-casein was degraded more by L. bulgaricus than by S. faecalis. Analysis of free amino acids liberated during incubation of the 2 cultures in whey + 2.5% casein and 2% $CaCO_3$ showed that L. bulgaricus liberated more threonine, valine + methionine and serine, and less isoleucine + leucine and histidine than S. faecalis. These results suggest that different proteinase systems are present in the 2 organisms. MEG

22

[Bacterial inoculum for Cheddar cheese.]
Butkus, K. D.; Nikolaev, A. M.; Klyuchyute, N. B.; Belova, G. A. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti; **Union of Soviet Socialist Republics,** Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 552 062 (1977) [Ru]

The cheddaring process is accelerated and flavour improved by using an inoculum comprising Streptococcus lactis 900_4, Str. cremoris $Mn4_5$, Str. cremoris 6_{30} and Lactobacterium [Lactobacillus] plantarum 28. W&Co

23

[Factors inhibiting bacteria in Manchego farm cheese.]
Martinez Moreno, J. L.
Revista Espanola de Lecheria No. 103, 3-10 (1977) [24 ref. Es] [Dep. de Microbiol., Inst. Nacional de Investigaciones Agrarias, Avenida Puerta de Hierro, Madrid, Spain]

Growth of Staphylococcus aureus in an extract of 3-month-old Manchego cheese (made from ewes' raw milk) was inhibited by H_2O_2 and stimulated by the addition of vitamins (Oxoid L21 Yeast Extract), catalase and lactose. Streptococcus lactis and Str. faecium showed little growth during 72 h in the cheese extract with or without the vitamins, catalase or lactose. Growth of Lactobacillus casei was greatly stimulated by catalase and lactose and by the 3 supplements together, but not by the yeast extract alone; it was inhibited by H_2O_2 except in the presence of lactose. Escherichia coli grew vigorously in the cheese extract without

supplements, and also in the presence of yeast extract and catalase, producing a final pH of ⩾8.0; in the presence of lactose or of all 3 supplements, however, its growth was reduced and the final pH was only 5.0-5.2. The poor growth of E. coli in the presence of lactose is thought to be due to the low pH (4.8-5.3) produced by lactic acid bacteria metabolizing lactose. It is concluded that in Manchego cheese use should be made of selected lactic acid bacteria which rapidly produce a sufficiently low pH (<5.2) to inhibit coliforms and sufficient H_2O_2 to inhibit Staph. aureus. ADL

24

Low salt fermentation method for conserving trash fish waste under SE Asian conditions. (In 'Proceedings of the Conference on the handling, processing and marketing of tropical fish' [see FSTA (1978) **10** 2R48].) [Lecture]
Stanton, W. R.; Quee Lan Yeoh
pp. 277-282 (1977) [16 ref. En, fr, es] [Univ. of Malaya, Kuala Lumpur, Malaysia]

Fish silage can be successfully produced under SE Asian conditions using a 1:1 fish:starch ratio with additives of 'ragi' and a lactic acid starter culture. The process is simple and inexpensive, and this safe intermediate technological approach to salvaging trash fish (about 60% of the catch in Malaysia is estimated as such) should be adaptable to local conditions. The end product of fermentation could potentially be used in human food although work so far has concentrated on its use as animal feed. AL

25

Fish cheese: the preservation of minced fish by fermentation. (In 'Proceedings of the Conference on the handling, processing and marketing of tropical fish' [see FSTA (1978) **10** 2R48].) [Lecture]
Herborg, L.; Johansen, S.
pp. 253-255 (1977) [3 ref. En, fr, es] [Min. of Fisheries, Building 221, Tech. Univ., 2800 Lyngby, Denmark]

The fermentation technology involved in the production of cheese from milk seems to be transferable to fish and the paper describes attempts to make fish cheese. Minced fish flesh from a meat/bone separator is heated to 80° C for 20 min and, after cooking, whey powder or sucrose (approx. 7.5%) is added. A Lactobacillus starter culture is added prior to incubation at 30° C for 24 h. After incubation the curd is pressed to remove water. The pressed blocks are then brined before being vacuum packed. The product has a shelf life of several months at ambient temp. due to the low pH (4.5). This non-traditional method of fish preservation may have applications in a number of countries but some problems require investigation, e.g. the strong lactic acid taste of the product which is caused by the failure of the curd to ripen as in ordinary cheese. AS

26

[Use of bifidogenic microflora in the manufacture of dried milk adopted for infant feeding.]
Dedicova, L.; Burdova, V.
Prumysl Potravin 28 (8) 453-455 (1977) [5 ref. Cs] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Concentrated whole milk was fermented with a mixed culture of Lactobacillus bifidus, Pediococcus acidilactici and L. acidophilus (ratio 1:1:0.1) at 31° C to the desired acidity, cooled with the addition of pasteurized vegetable oil, maltodextrin and lactose, homogenized and spray-dried with air at 340-350° C at the entry. Bifidogenic flora was determined in the dried product during storage at 20° C for 5 months and at 37° C for 3 months. The results showed that bifidogenic microflora may be successfully cultivated in concentrated milk with 20-25% TS. At 20° C the product retained its good microbiological qualities (satisfactory total counts and species ratio) for 4 months and no flavour defects were noted. FL

27

[Enzymic determination of D- and L-lactic acid in sugar factory juices.] Die enzymatische Bestimmung von D- und L-Milchsäure in Betriebssäften der Zuckerproduktion.
Kubadinow, N.; Rösner, G.
Zucker 30 (8) 420-426 (1977) [15 ref. De, en, fr] [Zuckerforschungs-Inst. Fuchsenbigl, A-2281, Austria]

The enzymic detn. of D- and L-lactic acid in sugar factory juices involves dehydrogenation to pyruvic acid with lactic dehydrogenase, and concomitant stoichiometric reduction of NAD, and spectroscopic detn. of NADH. The reaction was allowed to proceed to completion using removal of pyruvic acid by transamination with glutamate-pyruvate-transaminase (GPT). The conditions for the reaction were determined. Coloured components did not interfere with the detn. Clarification of juice with the Carrez reagent gave 98.95%, and with lead acetate 96.33% recovery. Analysis of thick juice (3 replicates) gave 68.72 mg L-acid/l. (s.d. ±0.49 mg, coeff. of variation ±0.71%) and 53.56 mg D-acid/l., (s.d. ±0.19 mg, coeff. of variation ±0.35%). When the hydrazine method for removing pyruvic acid was used, good agreement with the GTP method was obtained for L-lactic acid, but results for D-acid were about 10% lower with the hydrazine method; this was attributed to insufficient reaction time. RM

28

[Selection of medium for multiplication of phages of lactic streptococci and of homologous bacteria.]
Strzalkowska-Domanska, M.; Kalinowski, L.; Kordzik, B.; Bednarska, Z.
Roczniki Instytutu Przemyslu Mleczarskiego 19 (1) 63-76 (1977) [12 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

Streptococcus lactis R_4, Str. diacetilactis 246, and Str. cremoris 316 strains and their homologous phages isolated earlier by the 1st author [FSTA (1972) 4 1P37] were used, and glucose/$CaCO_3$ broth, dried enzymic casein hydrolysate, and pancreatin-hydrolysed milk (PHM) media of Polish manufacture were tested as such or supplemented with Difco yeast extract and NaCl; Difco Bacto Peptonized Milk as such or supplemented as above served as control. In general, supplementation did not appreciably increase phage production on the named media; the control Difco medium proved best in this respect, being closely followed by the PHM medium. The latter is recommended for large-scale preparation of phage concentrate as a satisfactory substitute for the imported medium. Addition of 1% lactose to PHM increased the yield of Str. cremoris phage, but not of the 2 others; and addition of 2% glucose markedly increased yields of the lactic streptococci in 2-h cultures. SKK

29

[Utilization of heat-tolerant strains of lactic streptococci for the activation of milk fermentation.]

Yakovlev, D. A.; Ibragimova, A. Z.; Abdonina, K. P.; Shamraeva, N. D.; Ilyushina, K. I.; Koshlakova, N. D.; Stolypina, E. G.

Maslozhirovaya Promyshlennost' No. 4, 24 (1977) [Ru] [VNIIZh, USSR]

Selected strains of Streptococcus diacetylactis increased milk acidity at 40° C to 65-68° T, while the diacetyl content (10 mg/l.) remained constant and the starter maintained its quality for 20 h when stored at 10° C. STI

30

Role of proteolytic enzymes of Streptococcus lactis, Penicillium roqueforti, and Penicillium caseicolum during cheese ripening.

Gripon, J.-C.; Desmazeaud, M. J.; Bars, D. le; Bergere, J.-L.

Journal of Dairy Science 60 (10) 1532-1538 (1977) [18 ref. En] [Lab. de Biochimie Microbienne, INRA, 78350 Jouy-en-Josas, France]

With the aim of determining the exact action of various enzymes from dairy microorganisms, proteolytic preparations were added to aseptic model curds free of microorganisms. Casein breakdown was followed by precipitation techniques, gel filtration, and acrylamide agarose gel electrophoresis. Purified acid protease from P. roqueforti and neutral protease from P. caseicolum induced large increases in pH 4.6-soluble N and non-protein N but had little effect on production of free amino acids. Crude homogenates of Str. lactis led to little increase in pH 4.6-soluble N and non-protein N but to a high increase in free amino acids. The acid protease from P. roqueforti and the neutral protease from P. caseicolum play a fundamental role in the proteolysis induced by their microorganisms during cheese ripening. AS

31

[Selection of bacteriophage-resistant nisin-producing streptococci.]

Lipinska, E.; Kosikowska, M.; Jakubczyk, E.; Lipniewska, D.

Roczniki Instytutu Przemyslu Mleczarskiego 18 (3) 5-15 (1976) [27 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, Warsaw, Poland]

6 phage-sensitive strains of Streptococcus lactis from the collection of the Dairy Industry Institute in Warsaw, Poland were treated with suspensions of 1 of 4 streptophages (3 obtained from the Pure Dairy Cultures Factory (Wytwornia Czystych Kultur Mleczarskich), and 1 from 'Polfa' pharmaceutical factory in Kutno, Poland). 7 colony cultures from among the total of 800 colonies isolated, representing 4 of the original strains, proved phage-resistant and good producers of nisin (600-1100 IU/ml culture medium). They retained these properties after 5 transfers and after industrial-scale fermentations at pH 6.5-6.8. Resistant cultures from 2 of the original strains retained resistance and nisin production after 30 transfers. SKK

32

Species differences and effect of incubation time on lactic streptococcal intracellular proteolytic enzyme activity.

Schmidt, R. H.; Morris, H. A.; McKay, L. L.

Journal of Dairy Science 60 (11) 1677-1682 (1977) [16 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St Paul, Minnesota 55108, USA]

33

Nutritional and chemical evaluation of the protein fraction from fermented ammoniated whey.

Erdman, M. D.; Reddy, C. A.; Bergen, W. G.

Journal of Dairy Science 60 (10) 1509-1514 (1977) [30 ref. En] [Dep. of Microbiol. & Public Health, Michigan State Univ., East Lansing, Michigan 48824, USA]

Whey from Cottage cheese was fermented with Lactobacillus bulgaricus at 43° C and pH 5.5 (NH_3 was added continuously to maintain the pH), and the fermented product was fractionated by dialysis into a protein fraction containing whey proteins and bacterial cells and an ammonium lactate fraction. The protein fraction, concentrated by evaporation and freeze dried, contained 95.5% TS, 64.4% crude protein, 6.9% lactose, and had a gross energy of 5.5 kcal/g. Approx. 91.6% of crude protein in the protein fraction was hot trichloroacetic acid (TCA)-precipitable or true protein. The modified essential amino acid index and in vitro protein digestibility of protein fraction were 99 and 92.4%. Based on feeding trials with rats, the protein fraction had a protein efficiency ratio of 4.1 $\pm$ 0.15 (of 3.34 $\pm$ 0.26 for casein). Protein fraction is a potentially valuable protein supplement for humans. AS

34

Some chemical and microbiological characteristics of leben.

Abo-Elnaga, I. G.; El-Aswad, M.; Moqi, M. .
Milchwissenschaft 32 (9) 521-524 (1977) [18 ref. En, de] [Dep. of Food Tech., Coll. of Agric., Univ. of Sulaimaniyah, Sulaimaniyah, Iraq]

Analytical methods for measuring diacetyl and acetoin in cultures of Streptococcus diacetylactis and Leuconostoc cremoris and in mixed strain starters and aroma forming bacteria are described. Chemical composition and characteristics of 21 samples of leben (a fermented milk product manufactured on farms in Iraqi villages) was: 3.0% fat, pH 3.9, 1.31% titratable acidity, 0.076% ethanol and 339 mg acetoin + diacetyl/kg. By plating on different media and incubating at 30° C for 5 days, yeasts were detected in all samples (with 18 containing lactose-fermenting yeasts similar to Saccharomyces lactis), streptococci were detected in 2 samples, and lactobacilli, coliforms and faecal streptococci each in 6 samples. Lactic acid bacteria were primarily Lactobacillus bulgaricus, Str. thermophilus and/or Str. lactis. Incubation of 2 strains of Sacch. lactis in sterile skim-milk at 37° C resulted in the formation of 0.56% ethanol and 369 mg acetoin + diacetyl/kg. It is concluded that such yeasts are natural constituents of leben and play an important role in flavour development. MEG

35

Obtention and characteristics of the biomass obtained from the basic strains of lactic acid bacteria.

Kornacki, K.; Rymaszewski, J.; Leman, J.
Acta Alimentaria Polonica 3 (1) 57-66 (1977) [26 ref. En, pl] [Dep. of Food Eng. & Biotech., Agric. & Tech. Acad., Olsztyn, Poland]

7 strains of Streptococcus lactis, 3 of Str. diacetilactis, 4 of Str. cremoris and 6 of Lactobacillus casei were grown in whey medium (obtained from milk that had been partially hydrolysed with pepsin or papain), enriched with glucose, corn steep liquor and mineral salts. Incubation was for 12 h at 30° C at constant pH 6.4-6.6 or (for L. casei) 24 h at 37° C and pH 5.2-5.4; excess lactic acid was either neutralized with ammonia (medium A), or removed on an ion exchange resin (medium B). Highest DM yields in the pepsin-hydrolysed whey medium A were (g/l.): Str. cremoris 329, 6.15; Str. lactis T_1, 5.18; and Str. lactis 1205, 4.82. In the papain-hydrolysed whey medium A, highest DM yields were: Str. lactis 1207, 6.00; Str. cremoris 333, 5.12; and Str. lactis 1205, 4.44. Three of the L. casei strains failed to grow adequately on the pepsin-hydrolysed whey media (A and B). Str. lactis 198 had the highest proteolytic activity. Highest fermentation activity (ml 0.1N NaOH required to neutralize 50 ml milk after 6 h) was shown by Str. diacetilactis 265 (33.8 ml), L. casei OL-1 (bn) (29.4 ml) and Str. lactis 1208 (27.3 ml) in pepsin-hydrolysed whey medium A, and by Str. diacetilactis strains 265 (32.0 ml) and Str. lactis T_1 (31.9 ml) in papain-hydrolysed whey medium A. CDP

36

Oxidative metabolism of lactic acid bacteria associated with pink discoloration in Italian cheese.

Shannon, E. L.; Olson, N. F.; Deibel, R. H.
Journal of Dairy Science 60 (11) 1693-1697 (1977) [20 ref. En] [Dep. of Food Sci., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Metabolism of Lactobacillus bulgaricus ATCC 12278 and Lb. helveticus ATCC 10797, associated with pink discoloration of cheese, was compared to that of Lb. lactis ATCC 11061 which never caused the defect. H_2O_2 was produced in various media by Lb. lactis but did not accumulate during growth of the other 2 strains. Cell suspensions of Lb. lactis consumed O_2 rapidly in the presence of glucose and lactate; the other strains were moderately active. Added tyrosine increased the ultimate intensity of pink discoloration in Romano cheese made with Lb. bulgaricus and Lb. helveticus; ascorbate, pyruvate, and fumarate accelerated the rate of development of the defect. These additives did not induce the defect in cheese made with Lb. lactis or Streptococcus thermophilus strain Mc which were never associated with the defect. Sodium thioglycolate and glutathione prevented the discoloration. AS

37

Studies on the methods for the preparation of enriched flavour distillate from lactic starter cultures.

Tiwari, M. P.; Madan Lal; Nambudripad, V. K. N.; Ranganathan, B.
Journal of Food Science and Technology, India 14 (2) 63-65 (1977) [7 ref. En] [Div. of Microbiol., Nat. Dairy Res. Inst., Karnal, Haryana, India]

Streptococcus B (a variant of Streptococcus A) [see FSTA (1973) 5 8P1078] was grown in skim-milk and citrated milk and the flavour distillate was collected before and after oxidizing with $FeCl_3$. The effect of (i) inoculum concn. (0.5-5%), (ii) incubation time (24-120 h), and (iii) aeration period (48 or 96 h) on the recovery of flavour compounds was studied. Diacetyl recovery was max. when (i) was 2%, (ii) was 96 h, and (iii) was 96 h with shaking (193 rev/min) for 4 h at the end of incubation. Oxidation of the fermented broth helps in the faster release of diacetyl. Simple distillation yielded more diacetyl than vacuum distillation. CFTRI

38

[Development of thermophilic lactic acid bacteria in presence of formaldehyde.]

Bottazzi, V.; Bersani, C.; Rastelli, A.
Annali della Facolta di Agraria, Universita Cattolica del Sacro Cuore, Milano 16 (1/2) 119-131 (1976) [15 ref. It, en] [Istituto di Microbiol. Agraria e Lattiero-Casearia, Fac. di Agraria, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

The binding of formaldehyde to milk components was studied in milk with 30-150 μg added formaldehyde/ml, at 45° C, and in milk with 25-26 μg formaldehyde/ml, at 21° and 52° C. During the first 12 h at 45° C the amount of free formaldehyde decreased markedly (from 30 to 14.2 and from 50 to 25.5 μg/ml), but thereafter the decrease was more gradual. After 168 h at 45° C, the free formaldehyde had diminished from 30 to 1.0, from 50 to 4.2, and from 100 to 17.4 μg/ml. After 8 h at 21° C (the temp. at which milk for Grana cheesemaking is normally held) the free formaldehyde had decreased from 25 to 19.8 μg/ml, but at 52° C (the highest temp. attained during cheesemaking) there was a decrease from 26 to 17 μg/ml within 1 h. Of 5 bacterial species studied in further experiments, using radioisotope techniques, Lactobacillus helveticus, L. fermentum and Streptococcus thermophilus were unable to metabolize ^{14}C-labelled formaldehyde whereas Pseudomonas aeruginosa and Aerobacter aerogenes converted 87.02 and 82.69% resp. to CO_2. In milk with about 4-11 μg formaldehyde/ml, growth and acid production of Str. thermophilus and L. lactis was inhibited for a period but then proceeded normally. The implications of these results are discussed with regard to use of formaldehyde for control of bacterial growth in cheesemaking. ADL

39

[Level of Gram-negative bacteria in milk.]
Desfleurs, M.; Desfleurs, M.
Lait 57 (567) 375-383 (1977) [4 ref. Fr, en] [Inst. du Lait, des Viandes & de la Nutr., Univ. de Caen, Caen, France]

Addition of 50 μg nalidixic acid/ml milk inhibits growth of Gram-negative bacteria. By comparing methylene blue reduction times and total plate counts in the presence and absence of nalidixic acid, numbers of Gram-negative bacteria can be determined, and the bacterial quality of the milk assessed. The use of nalidixic acid in the selection of lactic starters is also discussed. [See also FSTA (1977) 9 6P975.] MEG

40

[Filtration of lactic acid bacteria out of wine, using various filter materials.] Entkeimungsfiltration von Milchsäurebakterien aus Wein mit Filterschichten verschiedener Stoffzusammensetzung.
Radler, F.; Schönig, I.
Weinwirtschaft 113 (27) 752, 754-760 (1977) [6 ref. De] [Inst. für Mikrobiologie & Weinforschung, Johannes Gutenberg Univ., Mainz, Federal Republic of Germany]

Comparative studies were conducted on the efficiency of various filtration media (Seitz EK 4230, EKS 3730, SUPRA EK 3647 and SUPRA EKS 1698, and 6 commercial asbestos-free media) for removal of bacteria from wine. Trials were conducted with an 80% wine/20% must mixture containing Lactobacillus casei, Lactobacillus brevis, Leuconostoc oenos or Pediococcus pentosaceus at counts $\geqslant 10^3$/ml. Bacteria passing through the filter were collected on a membrane filter, and identified and determined after incubation on a suitable medium. Tables of results are given. The results show that the removal of P. pentosaceus and Lactobacillus brevis was best and that of Leuconostoc oenos was poorest. Of the filter media studied, the Seitz asbestos-containing media tended to give better results than the asbestos-free media. Most of the media studied would, however, give adequate results. AJDW

41

[Biochemical properties of the microflora of lactic cultures.] [Review]
Stepaniak, L.; Kornacki, K.; Habaj, B.
Przemysl Spozywczy 31 (9) 340-343 (1977) [30 ref. Pl, ru, en, fr, de]

This review discusses the ability of lactic acid bacteria to synthesize volatile compounds, and covers diacetyl, acetaldehyde, ethanol, dimethyl sulphide, acetone, short chain ethyl esters, volatile fatty acids production of CO_2, and proteolytic and lipolytic activities of lactic acid bacteria. HBr

42

[Method of obtaining a concentrate of lactic acid bacteria.]
Krasnikova, L. V.; Silant'eva, L. A.; Ezhov, I. S.; Novotel'nov, N. V.; Vasil'ev, N. F. **(Union of Soviet Socialist Republics, Leningradskii Tekhnologicheskii Institut Kholodil'noi Promyshlennosti)**
USSR Patent 557 783 (1977) [Ru]

A concentrate, e.g. for cheese production, is obtained by cultivating separately various strains of microorganisms, until a pH of 5.4-5.6 is reached; with low-activity strains the production rate is 0.3-0.4 l./h and with high-activity strains 0.6-0.8 l./h. The low-activity strains are then introduced continuously into the culture fluid with high-activity strains, with continuous take-off from the mixture for further centrifugal concn. and mixing with a protective preservative medium. The ratio of initial vol. of low and high activity strains used is 2:1. W&Co

43

Acid production and proteolytic activity in milk by gamma-irradiation induced mutants of lactobacilli
Jasjit Singh; Ranganathan, B.
Journal of Food Protection 40 (9) 600-602 (1977) [20 ref. En] [Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal 132001, Haryana, India]

Biochemical changes in selected γ-irradiation-induced mutants of Lactobacillus bulgaricus and L. casei were examined. Cultures were tested after 24 of incubation at 37° C for titratable and volatile acidities and proteolytic activity. The γ-irradiation-induced mutants exhibited 50-95% greater proteolytic activity than the unirradiated parent cultures. Some of the mutants produced greater titratable and volatile acidities in milk compared

with parent cultures. 2 mutant cultures, Lb/G-1 from L. bulgaricus 59 and Lc/G-1 from L. casei RTS released significantly greater amounts of soluble N and amino N in whole casein and selected fractions than did parent cultures. Combining the mutant cultures with Streptococcus lactis C_{10} or Str. cremoris C_1 resulted in greater acid producing ability than that of the parent cultures mixed with the streptococci. AS

44

[Lactobacillus acidophilus strain NK_{10}, for use in preparation of soured milk products.]
Koroleva, N. S. (**Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 558 044 (1977) [Ru]

The strain is preserved in the collection of the All-Union Research Institute for the Milk Industry. Cell size in an 18-h culture in milk is 10-20 μm, and the cells are uniformly coloured and single or in groups of 4-6. In hydrolysed milk agar, rough deep colonies are formed 1.5-2 mm in diam. Min., optimum and max. growth temp. are 20°, 38-40° and 60-62° C. The strain ferments lactose, glucose and maltose, but not sucrose. Milk is coagulated at optimum temp. by a 3% inoculum in 5-6 h, acidity being 100°T and 200-220°T after 1 and 3 days. The strain grows in milk with a phenol content of 0.6%. Filtrates of culture fluid and 1:2 and 1:4 dilutions, neutralized with chalk, suppress the growth of Escherichia coli. W&Co

45

[Homogeneous strain of aromatizing mesophilic lactic-acid microorganism Streptococcus acetoinicus 289, for use in combination with Streptococcus lactis 905 in two-strain inoculum for production of curds, sour cream and soured milk.]
Bannikova, L. A.; Zadoyana, S. B. (**Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 559 950 (1977) [Ru]

The strain is preserved in the collection of the All-Union Research Institute for the Milk Industry. Cells of a 17-h culture in milk are 0.4-0.6 μm in diam. and are single, pairs or in 4-6 cell chains. In hydrolysed milk agar, 2-day colonies are round, 1-3 mm in diam., white with a slightly creamy tint and a smooth edge, while addition of calcium citrate to the medium produces zoned colonies. The strain forms a thick uniform turbidity in liquid hydrolysed milk, and a uniform thick clot in milk. Arabinose, fructose, glucose, galactose, maltose, mannose and lactose are utilized. The strain forms 9.1 mg diacetyl/l. and a volatile acidity equivalent to 2.5 ml 0.1N NaOH. The variability factor is < 10%. The strain actively coagulates milk and produces aroma compounds at any season of the year. W&Co

46

[Streptococcus cremoris strain 151 of mesophilic lactic acid streptococcus for use in three-strain inoculum for production of curds, sour cream and soured milk.]
Bannikova, L. A.; Zadoyana, S. B.; Pyatnitsyna, I. N. (**Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 558 043 (1977) [Ru]

The strain is preserved in the collection of the All-Union Research Institute for the Milk Industry. Cells are 0.6-0.8 μm in diam. in chains of various lengths, rarely as diplococci. On hydrolysed milk agar, 2-day colonies are round, white with a pink edge and 1-2 mm in diam., while on Reddy organo-mineral medium they are 3-4 mm in diam. and yellow with zones and a smooth edge. In liquid hydrolysed milk the strain forms a moderate uniform turbidity and slight deposit, while in milk it produces a clot of sour cream-like consistency, after 5-6 h. Optimum growth temp. is 20-22° C. The strain utilizes arabinose, glucose, fructose, galactose, mannose, lactose, and more weakly maltose and raffinose, but not xylose, sucrose, rhamnose, sorbitol, mannitol, dulcitol or starch. The strain forms volatile acids in an amount equivalent to 1.1 ml 0.1N NaOH/l., and 2.9 mg diacetyl/l. Ammonia is not produced from arginine. The strain is less sensitive to milk quality than other production strains, and in spring shows vigorous acid formation, good milk-clotting activity and more stable cell morphology. W&Co

47

Studies on the citric acid fermentation in lactic starter cultures with special interest in α-aceto-lactic acid. I. Analytical procedures.
Jönsson, H.; Pettersson, H.-E.
Milchwissenschaft 32 (9) 513-516 (1977) [21 ref. En, de] [Swedish Dairies' Ass., Cent. Lab., Box 205, S-201 22 Malmö, Sweden]

Analytical methods are described for measuring diacetyl, acetoin and α-acetolactic acid in cultures of Streptococcus diacetylactis and Leuconostoc cremoris and in commercial mixed strain starters and aroma-forming bacteria grown in a skim milk medium at 20° C for 20 h. Diacetyl was isolated from the starter cultures by distillation in an inert atm and measured by differential pulse polarography. Acetoin in the distillate was measured by a GLC method. α-acetolactic acid was determined by its ability to reduce ammonium molybdate to molybdene blue in acid solution and measurement of the absorbance at 720 nm, or by a method based on the different oxidative stabilities of α-acetolactic acid during distillation of a culture in the presence of O_2 or N_2. [See following abstr. for part II.] MEG

48

Studies on the citric acid fermentation in lactic starter cultures with special interest in α-aceto-lactic acid. II. Metabolic studies.
Jönsson, H.; Pettersson, H.-E.
Milchwissenschaft 32 (10) 587-594 (1977) [17 ref. En, de] [Swedish Dairies' Ass., Cent. Lab., Box 205, S-201 22 Malmö, Sweden]

Citric acid metabolism of the aroma-forming lactic starter cultures (described in the preceding abstr.) was studied by measuring the production of acetoin, α-acetolactic acid and diacetyl during growth at 20° C. In order to increase the diacetyl content, the starter culture can either be cooled to 5° C when there is still some unfermented citric acid present in the culture medium, or the oxidation-reduction potential of the culture increased by aeration, resulting in a spontaneous oxidative decarboxylation of α-acetolactic acid to diacetyl. MEG

49

[Antibacterial activity of a fermented milk drink made with Lactobacillus casei YIT 9018 on the pathogenic bacteria.]
Kang, K. H.; Lee, S. W.; Back, Y. J.; Yun, Y. H.; Kim, K.
Korean Journal of Animal Science 19 (3) 227-233 (1977) [39 ref. Ko, en] [Lab. of Korea Yakult Milk Products Co. Ltd., Seoul, Korea]

The antibacterial activity of milk fermented with Lactobacillus casein YIT 9018 was studied using various pathogenic bacteria. A sample of the fermented milk was inoculated with 10^5 bacteria/ml, stored at 37° or 5° C and examined for changes in viable numbers of organisms and titratable acidity. The viable number of pathogenic organisms decreased at 37° C after 1 h storage. Salmonella typhi HY 24, S. typhimurium HY 26, S. newport HY 28 disappeared after 3 h storage, S. cholerasuis HY 25 and S. enteritidis HY 27 after 4 h, Shigella flexneri HY 29 and Staphylococcus aureus HY 30 after 7 h, and Escherichia coli strains after 18 h storage. With the exception of S. typhi HY 24, a similar decline in viable numbers did not occur until 24 h storage at 5° C. S. cholerasuis HY 25 and S. newport HY 28 disappeared within 48 h storage at 5° C, and the milk was almost free of the other pathogenic bacteria within 48 h of storage. Changes in viable numbers of lactobacilli and in titratable acidity in the fermented milk were not significantly different during the experimental periods. [From En summ.] SP

50

Effect of conventional and microwave heating on Pseudomonas putrefaciens, Streptococcus faecalis and Lactobacillus plantarum in meat tissue.
Crespo, F. L.; Ockerman, H. W.; Irvin, K. M.
Journal of Food Protection 40 (9) 588-591 (1977) [24 ref. En] [Anim. Sci. Dep., Ohio State Univ., Columbus, Ohio 43210, USA]

Conventional cooking in an oven at 176 ± 6° C proved to be more destructive than microwave cooking when individual strains of P. putrefaciens, L. plantarum, and S. faecalis were inoculated and grown in aseptically obtained meat tissue and then heated and compared at similar final internal temp P. putrefaciens was the most heat sensitive microorganism in both cooking techniques. S. faecalis was the most heat resistant strain when cooked by conventional means but L. plantarum proved to be the most resistant when heat was applied by microwave energy. AS

51

Use of canonical variates analysis in differentiation of bacteria by pyrolysis gas liquid chromatography.
Macfie, H. J. H.; Gutteridge, C. S.; Norris, J. R.
Journal of General Microbiology 104 (1) 67-74 (1978) [22 ref. En] [Agric. Res. Council, Meat Res. Inst., Langford, Bristol, Avon BS18 7DY, UK]

Low-resolution pyrolysis gas-liquid chromatography (PGLC) can differentiate genera of aerobic food spoilage bacteria including Lactobacillus and Pseudomonas spp. Multivariate statistical techniques were applied, but neither principal components nor furthest neighbour cluste analysis produced a consistent differentiation although both confirmed the reproducibility of PGLC. When the distance between genera was redefined in terms of Mahalanobis D^2 - a generalized concept taking into account scatter around the mean - good differentiation was observed and could be displayed graphically by plotting the genus group means relative to the first two canonical variate axes. The coeff. of the canonical variates provide a strategy for discriminating between the genus groups. Some practical problems in the identification of unknowr using this technique are discussed. AS

52

[Process of manufacture of food products.]
Bodielait
French Patent Application 2 330 334 (1977) [Fr]

A food product particularly a milk product, is characterized by addition of ⩾1 strains of bacteria present in the human or animal digestive tract. The strain(s) chosen may be Lactobacillus acidophilus, L. casei, L. plantarum and/or L. fermenti. If the food product is yoghurt (it could also be a cheese) the desired organism is added in a concentrated form to milk at the same time as adding the starter product is obtained having low acidity, a pleasant taste, large amounts of bacteria which are naturally present in the flora of the digestive tract, and a bacterial content which is reproducible, e.g. for dietetic purposes. W&Co

53

[Method for using lactic acid fermentation as a preserving method for fish raw material for the production of meal and oil.]
Mjelde, A. (Norway, Sildeolje- og Sildemelindustriens Forskningsinstitutt)

Norwegian Patent Application 136 633 (1977) [No]

Large quantities of fish (particularly capelin) for the manufacture of fish meal and oil may be preserved by lactic acid fermentation where storage for a limited period of time before processing is required either at the factory or on a fishing vessel. Satisfactory fermentation after adding approx. 1% of a starter culture is obtained by adding 10 g carbohydrate (e.g. molasses), 300 mg sodium nitrite and optionally 500 mg formaldehyde/kg fish. W&Co

54

Isolation and characterization of an inhibitory substance against Escherichia coli produced by Lactobacillus acidophilus.
Hosono, A.; Yastuki, K.; Tokita, F.
Milchwissenschaft 32 (12) 727-730 (1977) [23 ref. En, de] [Fac. of Agric., Shinshu Univ., Ina, Nagano-Ken 396, Japan]

Cells of L. acidophilus 1F0 3205, grown in a yeast extract-peptone-lactose medium for 48 h at 37° C, were harvested by centrifuging, suspended in phosphate buffer, pH 7.0, and disrupted by sonication. When the cell-free extract was treated with an equal vol. of methanol, all the antimicrobial activity was present in the supernatant fluid. Further purification of the antimicrobial substance was achieved by ultrafiltration and Sephadex G-25 gel filtration. Analysis of the purified preparation indicated that it was a peptide with a mol. wt. of approx. 3500. The preparation had a growth-inhibiting effect on E. coli K-12, and caused elongation of the cells and a decrease in their DNA content. [See Japanese Journal of Zootechnical Science (1977) 48 (5) 250-255.] MEG

55

New methods of acidophilus milk manufacture and the use of bifidus bacteria in milk processing.
Lang, F.; Lang, A.
Milk Industry 80 (1) 22-23, 28 (1978) [7 ref. En] [Commonwealth Bureau of Dairy Sci. & Tech., Shinfield, Reading RG2 9BB, UK]

This article summarizes recent developments in the less known cultured milk products, with particular reference to the new types of acidophilus milk in Czechoslovakia (involving separate cultivation of Lactobacillus acidophilus and a cream culture in 2 batches of milk and subsequent remixing) and in the USA (made by adding a concentrated culture of L. acidophilus into low-fat pasteurized milk without subsequent incubation), fermented milk in Japan (made using an intestinal isolate of L. casei) and to the use of Bifidobacterium bifidum in the production of tvaroh (fresh cheese) desserts for children, and in a dried infant milk formula together with Pediococcus acidilactici and L. acidophilus. [See also FSTA (1976) 8 2P361.] FL

56

[Direct serological determination of group B streptococci (Streptococcus agalactiae) in milk.]
Untersuchung zur direkten serologischen Bestimmung von B-Streptokokken (Sc. agalactiae) in Milchproben.
Röttger, B.
Archiv für Lebensmittelhygiene 28 (1) 15-17 (1977) [13 ref. De, en] [Inst. für Hygiene & Tech. der Milch, Bischofsholer Damm 15, D-3000 Hannover, Federal Republic of Germany]

374 herd milk samples, 102 samples from individual cows and 943 quarter milk samples were examined for group B streptococci by the CAMP test and by counter immunoelectrophoresis. Results, shown graphically, indicate that the serological test was the most effective when milk contained <300 000 cells/ml. It also has forensic advantages, provides rapid results and does not require sterile operation. The majority of milk samples containing group B streptococci had cell counts <500 000/ml milk. RM

57

[Factors influencing the activity of starter cultures in milk. I. Incubation at 15° and 22° C.]
Kriel, J. B.; Holzapfel, W. H.
South African Journal of Dairy Technology 9 (3) 97-100 (1977) [20 ref. Af, en] [Anim. & Dairy Sci. Res. Inst., Irene 1675, South Africa]

Single strain cultures of Streptococcus cremoris E8 and AM2, Str. lactis C6 and H1, and Str. diacetilactis DRC1 and DRC2 were incubated for 72 h at 15° or 22° C, or for 12 h at 22° C and 60 h at 5° C. Changes in pH and culture activity were measured at intervals during incubation. Max. activity was reached in about 12 h at 22° C and in about 24 h at 15° C; after 36 h there was a reduction in activity at both incubation temp., whereas the cultures incubated at 22° C for 12 h and then cooled to 5° C maintained max. activity for 60 h. Cultures propagated in milk (10% TS) reached max. activity at a pH of 4.60-4.70, irrespective of the inoculum size or incubation temp. (15-30° C). Results indicate that "over-ripe" (long lag phase) starters are caused by other factors in addition to over-incubation. At 15° C the phage titres were 10- to 1000-fold less than at 22° C. Use of a larger inoculum for starter culture propagation enables a pH of 4.60-4.70 to be reached within 7-8 h. MEG

58

[New look at cultured milk beverages.]
Cerna, J.
Vyziva Lidu 32 (12) 178-179 (1977) [Cs] [Vyzkumny Ustav Potravinarskeho Prumyslu, Prague, Czechoslovakia]

The author examines beneficial effects of cultured milk products in human nutrition with reference to recent research carried out in

Czechoslovakia and foreign countries. Amongst new Czechoslovak cultured products are 'Biokys' made with a starter incorporating Bifidobacterium bifidum and 'Lakton B', a dried infant formula enriched with this bacterium. FL

59

[Influence of lactic acid bacteria on the organoleptic characteristics of some dairy products.] [Review]
Kornacki, K.; Stepaniak, L.; Habaj, B.
Przemysl Spozywczy **31** (10) 378-380 (1977) [31 ref. Pl, ru, en, fr, de]

Aspects covered in this review of the variable ability of lactic acid bacteria to form volatile compounds and degrade protein are: aroma and flavour of starter, twarog, butter and cheese; and the defects of cheese attributable to the microflora of the milk. HBr

60

A comparison of the activity of Lactobacillus bulgaricus and one of its mutants in different types of milk.
Jasjit Singh; Ranganathan, B.
Journal of Dairy Research **45** (1) 123-125 (1978) [8 ref. En] [Div. of Dairy Bact., Nat. Dairy Res. Inst., Karnal 132001, Haryana, India]

Cows', buffaloes' and goats' skim-milks were incubated for 24 or 48 h with L. bulgaricus strain 59 or its γ-radiation induced mutant. Both the cultures produced higher titratable and volatile acidities and liberated more tyrosine in buffaloes' milk than in the other types of milk. They produced no diacetyl or acetoin in the milks. The mutant culture was biochemically more active than the parent strain in all the milks. DMK

61

Identification of thermobacteria and homofermentative, thermophilic, pentose-utilizing lactobacilli from high temperature fermenting grape musts.
Barre, P.
Journal of Applied Bacteriology **44** (1) 125-129 (1978) [15 ref. En] [Sta. de Tech. Vegetable, Inst. Nat. de la Recherche Agronomique, Ecole Nat. Superieure Agronomique, 34060 Montpellier Cedex, France]

8 strains belonging to Thermobacterium were isolated from high temp. (between 40° and 43° C) fermenting grape musts. They resembled Lactobacillus acidophilus very closely. 4 other thermophilic homofermentative strains were somewhat different: they fermented arabinose and ribose with production of >90% of the end product carbon as lactate. This involved a metabolic pathway undescribed among lactic acid bacteria. AS

62

Effect of carbohydrates and phosphates on acid production by lactic acid bacteria in soy milk.
Mital, B. K.; Rajendra Prasad; Surjan Singh
Journal of Food Science and Technology, India **14** (4) 182-184 (1977) [7 ref. En] [Dep. of Food Sci. & Tech., G.B. Pant Univ. of Agric. and Tech., Pantnagar, Nainital, Uttar Pradesh, India]

The effect of mixing carbohydrates ((i) glucose, (ii) sucrose, and (iii) lactose, each at 0.5, 1 and 2% levels) on acid production and pH of soymilk fermented by Streptococcus thermophilus, Sy-1, Lactobacillus acidophilus and L. plantarum and mixed cultures of these was studied. Acid production was max. at 1% level of added carbohydrate, which was selected for further study. Max. acid production was given by: Strep. thermophilus with (i) and (iii) (developed acidity (DA), 0.51 and 0.47% resp.); by Sy-1 with (iii) (DA, 0.62%); by L. acidophilus with (i) and (ii) (DA, 0.87% and 0.73% resp.); and by L. plantarum with (i) and (iii) (DA, 0.96% in both). Acid production was irregular when mixed cultures were used. Soymilk enriched with (i)-(iii) and fermented with the first 3 cultures listed developed a lower pH. CFTRI

63

Proteolytic activity of two Lactobacillus species and their gamma radiation induced mutants.
Singh, J.; Ranganathan, B.
Journal of Food Science and Technology, India **14** (3) 135-137 (1977) [11 ref. En] [Nat. Dairy Res. Inst., Karnal-132 001, Haryana, India]

Proteolytic enzymes from 2 Lactobacillus spp. degraded cows' milk casein and crossbred cows' milk casein more than buffaloes' and goats' milk caseins. Degradation by γ-irradiation-induced mutants of the 2 Lactobacillus spp. was much faster than that by the parents. CFTRI

64

Inhibition of enteropathogenic Escherichia coli by homofermentative lactic acid bacteria in skimmilk. I. Comparison of strains of Escherichia coli.
Frank, J. F.; Marth, E. H.
Journal of Food Protection **40** (11) 749-753 (1977) [26 ref. En] [Dep. of Food Sci., Food Res. Inst., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Behaviour of enteropathogenic and non-pathogenic strains of E. coli was determined when they were grown in skim milk with and without 0.25 or 2.0% added lactic starter and incubated at 21° or 32° C for 15 h, and then after refrigeration at 7° C. With no lactic starter present, generation time for E. coli ranged from 28 to 35 min at 32° C and from 66 to 109 min at 21° C. At 32° C, after an initial 1- to 3-log increase in numbers and 6-9 h of incubation, E. coli was completely inhibited by bot concn. of starter culture. Complete inhibition of

growth of E. coli occurred earlier at 32° than at 21°C, but smaller numbers of E. coli were obtained at 21°C; some strains virtually did not grow. The final pH of fermented milks ranged from 4.4 to 4.6. The longest survival time for E. coli in refrigerated fermented milk was about 17 days when milk was fermented at 32°C with 0.25% starter. A combination of lower incubation temp. (21°C) and higher starter concn. (2.0%) was most effective in controlling growth of E. coli in fermented skim-milk. AS

65

Inhibition of enteropathogenic Escherichia coli by homofermentative lactic acid bacteria in skimmilk. II. Comparison of lactic acid bacteria and enumeration methods.

Frank, J. F.; Marth, E. H.

Journal of Food Protection 40 (11) 754-759 (1977) [13 ref. En] [Dep. of Food Sci., Food Res. Inst., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Inhibition of enteropathogenic E. coli in skim-milk at 21° and 32°C by 0.25 and 2.0% of added Streptococcus lactis, Str. cremoris or a mixed strain starter culture was studied. After 15 h of fermentation, fermented milks were refrigerated at 7°C and then were tested periodically for survival of E. coli. Three methods for enumeration of E. coli during these fermentations were compared. They included trypticase soya agar (TSA) pour plates, violet red bile agar (VRB) pour plates, and TSA surface plating with a VRB overlay. Lactic cultures had similar inhibitory properties at 32°C, but there were differences at 21°C, with Str. lactis being least inhibitory and the mixed strain culture most inhibitory. The VRB pour plate method gave poorest recovery of E. coli when fermentation was at 32°C and when fermented milks were refrigerated. The TSA surface plating method apparently allowed for recovery of injured E. coli cells and gave results similar to the TSA pour plate method. AS

66

Enumeration and identity of Lactobacilli in dietary products.

Gilliland, S. E.; Speck, M. L.

Journal of Food Protection 40 (11) 760-762 (1977) [11 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

A medium was developed for selectively enumerating bile-resistant lactobacilli by adding 0.15% oxgall to Lactobacillus selective agar. Lactobacilli were not found in many products sold as sources of Lactobacillus acidophilus, whereas others contained widely different numbers of lactobacilli capable of forming colonies on the bile medium. Of 7 products from which lactobacilli were isolated, only 3 contained L. acidophilus. One of these products was from a pharmacy and the other 2 were from dairy processor(s). AS

67

Antagonistic action of Lactobacillus acidophilus toward intestinal and foodborne pathogen in associative cultures.

Gilliland, S. E.; Speck, M. L.

Journal of Food Protection 40 (12) 820-823 (1977) [14 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

L. acidophilus exerted antagonistic actions on growth of Staphylococcus aureus, Salmonella typhimurium, enteropathogenic Escherichia coli and Clostridium perfringens when grown with each in associative cultures. S. aureus and C. perfringens were more sensitive to the inhibition than were S. typhimurium and E. coli. The amount of the antagonism produced varied among strains of L. acidophilus and could not be directly related to amounts of acid produced; H_2O_2 produced by the lactobacilli appeared to be partially responsible for the antagonistic interaction. The inhibitory effect was produced also under anaerobic conditions in a pre-reduced medium. AS

68

[Use of bacterial concentrates in margarine manufacture.]

Yakovlev, D. A.; Ibragimova, A. Z.; Avdonina, K. P.; Shamraeva, N. D.; Ilyushina, K. I.; Koshlakova, K. G.; Stolypina, E. G.

Maslozhirovaya Promyshlennost' No. 9, 21-22 (1977) [8 ref. Ru] [VNIIZh, USSR]

8 aroma-producing starters comprising Streptococcus lactis, Str. cremoris and Str. diacetilactis were cultivated in 4 different media, centrifuged to concentrate the cells and freeze-dried. Sterile milk with 16% TS or an aqueous solution of sucrose + sodium citrate were found to be the best protective substances. The concentrates contained 600 000-800 000 million cells/g and their activity was 10x higher than that of ordinary dried cultures. In trials under manufcturing conditions, the use of the concentrate (direct addition at 3 g/t or after reconstitution to liquid culture) produced fermented milk of clean lactic flavour, pronounced aroma and good consistency which, when used in margarine manufacture, gave a product of good quality with 2.25-2.75 mg diacetyl/kg. FL

69

Dialysis continuous process for ammonium-lactate fermentation of whey: mathematical model and computer simulation.

Coulman, G. A.; Stieber, R. W.; Gerhardt, P.

Applied and Environmental Microbiology 34 (6) 725-732 (1977) [9 ref. En] [Dep. of Chem. Eng., Michigan State Univ., E. Lansing, Michigan 48824, Michigan, USA]

A mathematical model was developed to describe a dialysis process for the continuous fermentation of whey lactose to lactic acid, with

neutralization to a constant pH by ammonia. In the process, whey of a relatively high concn. is fed into the fermenter circuit at a relatively low rate so that the residual concn. of lactose is low. The fermenter effluent contains ammonium lactate, bacterial cells, and residual whey solids and could be used as a nitrogen-enriched feedstuff for ruminant animals. Only water is fed into the dialysate circuit at a relatively high rate. The dialysate effluent contains purified ammonium lactate and couid be converted to lactic acid and $(NH_4)_2SO_4$ for industry. The fermentation was specifically modelled as a set of equations representing material balances and rate relationships in the 2 circuits. Dialysis continuous fermentations, in general, were modelled by combining these equations and by using dimensionless parameters. The generalized model was then solved for the steady state and used to simulate the specific fermentation on a digital computer. Results showed the effects of various material and operational and kinetic parameters on the process and predicted that it could be operated efficiently. [See also following abstr.] AS

70

Dialysis continuous process for ammonium-lactate fermentation of whey: experimental tests.
Stieber, R. W.; Coulman, G. A.; Gerhardt, P.
Applied and Environmental Microbiology 34 (6) 733-739 (1977) [10 ref. En] [Dep. of Microbiol., Michigan State Univ., E. Lansing, Michigan 48824, USA]

Laboratory experiments were conducted to validate theoretical predictions describing a dialysis continuous process for the fermentation of whey lactose to ammonium lactate, in which the fermenter contents are poised at a constant pH by adding ammonia solution and dialysed through a membrane against water. Dried sweet-cheese whey was rehydrated to contain 230 mg lactose/ml, supplemented with 8 mg of yeast extract/ml, charged into a 5 l. fermenter without sterilization, adjusted in pH (5.3) and temp. (44° C), and inoculated with Lactobacillus bulgaricus. The fermenter and dialysate circuits were connected, and steady-state conditions were established. A series of such conditions was managed non-aseptically for 94 days to study the process and to demonstrate efficiency and productivity. As time progressed, the fermentation remained homofermentative and increased in conversion efficiency, although membrane fouling necessitated dialyser cleaning about every 4 wk. With a retention time of 19 h, 97% of the substrate was converted into products. Relative to non-dialysis continuous or batch processes for the fermentation, the dialysis continuous process enabled the use of more conc. substrate, was more efficient in the rate of substrate conversion, and additionally produced a second effluent of less conc. but purer ammonium lactate. [See also following abstr.] AS

71

Isolation of a bacteriophage of Leuconostoc mesenteroides from dairy products.
Sozzi, T.; Poulin, J. M.; Maret, R.; Pousaz, R.
Journal of Applied Bacteriology 44 (1) 159-161 (1978) [6 ref. En] [Dep. of Tech. Development, Nestle Products Tech. Assistance Co. Ltd., Lausanne, Switzerland]

72

[Fractionation of a microbial growth stimulator (maize extract) by gel filtration.]
Vetrova, I. V.; Zvyagintsev, V. I.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti
No. 16, 24-27, 61, 66 (1974) [Ru, en]
[VNIIMiSP, Uglich, USSR]

Maize extract with growth-stimulating activity for lactic streptococci [see FSTA (1971) 3 10P1634] was fractionated on R-4 gel using the 'Re-Cy-Chrom' gel filtration apparatus. Results of 3 consecutive fractionations are presented graphically (in terms of light absorption at 280 nm). Tests on milk with Streptococcus paracitrovorus showed that only 10-15% of the extract was stimulatory; 3 ninhydrin-positive components were detected in the active fractions. SKK

73

Problems posed by selective media for lactic streptococci; stability of industrial starters.
Chazaud, M.-T.
Revue Laitiere Francaise No. 358, 605, 607 (1977) [6 ref. Fr, en] [Lab. de Microbiol., 4 Rue Ledru, Univ. de Clermont-Ferrand, Clermont-Ferrand 63000, France]

Elliker's medium, which was the best of 4 selective media for lactic streptococci, gave $<50\%$ isolates of lactic streptococci in total microflora. Of 113 lactic streptococci isolated from farm raw milk, 10 were Streptococcus cremoris, 86 Str. lactis and 17 Str. diacetilactis; corresponding figures for 86 isolates from manufacturing milk were 47, 19 and 20. During preparation of commercial starters, there was a progressive shift from mainly Str. cremoris to mainly Str. lactis with each subculture; the proportion of Str. diacetilactis fluctuated between <5 and 40%. CDP

74

[Bacterial concentrates for small cheeses with specific antagonistic activity against microflora capable of causing cheese blowing.]
Gudkov, A. V.; Khandak, R. N.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti
No. 16, 3-9, 59, 65 (1974) [11 ref. Ru, en]
[VNIIMiSP, Uglich, USSR]

Lactobacillus plantarum 28 strongly inhibited growth of coliforms and had a specific antagonistic action against Clostridium tyrobutyricum.

Investigation of 201 strains of lactic streptococci showed that antagonistic activity against coliforms decreased in the order Str. diacetilactis > Str. paracitrovorus > Str. lactis > Str. cremoris, and that the activity was in general lower than that of lactobacilli. It was concluded that a cheese starter capable of inhibiting both butyric acid bacteria and coliforms should include selected strains of lactobacilli and lactic streptococci. Numerous combinations of strains of both groups of microorganisms were tested, and dried bacterial concentrates and industrial starters were produced on this basis, the concentrates containing 65% of the total microflora as aroma-forming streptococci and 5.6% as lactobacilli. The preparations retained their antagonistic activities and satisfied other criteria for good quality cheese starters. [See also following abstr.] SKK

75

Increase of proteolytic activity in Lactobacillus casei by X-ray irradiation.
Singh, J.; Ranganathan, B.
Experientia 34 (2) 183-184 (1978) [5 ref. En] [Dairy Microbiol. Div., Nat. Dairy Res. Inst., Karnal 132001, Haryana, India]

Proteolytic activity of L. casei strain RTS which had been irradiated with up to 27 000 R was compared with activity of non-irradiated controls; the bacteria were grown in sterilized skim-milk for 24 h at 37° C and tyrosine released was measured. A linear regression equation of tyrosine liberated was in agreement with the zone of clearance. An X-ray dose of 18 000 R gave < 1% survival of L. casei RTS, and mutants (only those with > 10 mm clearance zone) were isolated. In 5 trials with 50 colonies in each, mean proteolytic activity of the mutants was 0.632 mg tyrosine liberated/g curd compared with 0.345 for the non-irradiated parent culture. DMK

76

[Comparative characterization of effects of some stimulators on growth and proteolytic activity of individual species of lactic acid microflora.]
Vetrova, I. V.; Zvyagintsev, V. I.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 16, 46-50, 63, 69 (1974) [12 ref. Ru, en] [VNIIMiSP, Uglich, USSR]

Cultures of (i) Streptococcus lactis, (ii) Lactobacillus casei, (iii) Betabacterium caucasicum and (iv) Propionibacterium shermanii were added to sterilized milk at 1% with or without KE3 preparation (by-product of acetone/butyric fermentation supplied by the Bakh Institute of Biochemistry of the USSR Academy of Sciences), or with or without KS preparation (maize extract supplied by the Moscow Medical Preparations Factory). KE3 was added at 1% for (i) and (ii) and at 5% for (iii) and (iv); and KS was added at 1% throughout. Data for acidity development by and growth of (i) cultures after incubation for 12 and 24 h (temp. not stated) and for presence of soluble proteins, peptides and amino acids after unspecified incubation of (i)-(iv) cultures are tabulated. It is concluded that KE3 and KS markedly stimulated multiplication of (iii) and (iv) which grow slowly in customary media; and that both preparations influenced markedly the proteolytic activities of (i)-(iv). SKK

77

The use of lactic starter in Domiati cheese made from pasteurized milk.
Farahat, S. M.; Mahran, G. A.
Sudan Journal of Food Science and Technology 6, 38-40 (1974) [7 ref. En] [Food Sci. Dep., Zagazig Univ., Cairo, Egypt]

After experiments with Streptococcus lactis starter additions of 0.2% to 4.0% had shown that cheese made with > 2% starter was too soft and that cheese yield decreased with increasing starter additions, a further experiment was carried out comparing cheese made without starter. Cheese made with 0.5% starter showed improved curd formation and cheese characteristics both when fresh and after pickling for 4 wk. EJM

78

Hydrolysis of casein by intracellular proteases from lactic acid bacteria.
Ohmiya, K.; Sato, Y.
Agricultural and Biological Chemistry 42 (1) 7-10 (1978) [16 ref. En] [Dep. of Food Sci. & Tech., Fac. of Agric., Nagoya Univ., Nagoya 464, Japan]

Intracellular proteases (IPLB) from Streptococcus cremoris, Str. lactic, Lactobacillus bulgaricus and L. helveticus were prepared and their proteolytic properties against bovine whole casein from 3 sources and also against casein fractions were studied at 30° C, pH 7.0. β-Casein was hydrolysed more easily than α_s-casein by each IPLB. These findings were also derived from the patterns of the agar-gel electrophoresis of the hydrolysis products of casin-I which were obtained with each IPLB. κ-Casein prepared from either casein-I or -II was more easily hydrolysed than β-casein by each IPLB. AS

79

Evaluation of Streptococcus cremoris for preparing frozen concentrated starter cultures.
Piatkiewicz, A.; Libudzisz, Z.; Jakubowska, J.
Acta Microbiologica Polonica 9 (4) 407-412 (1977) [13 ref. En] [Inst. of Fermentation Tech. & Microbiol., Tech. Univ., Wolczanska 175, 90-924 Lodz, Poland]

5 strains of Str. cremoris were grown in 9 different media to determine optimum cultural conditions for biomass productions. 3 strains grew well in APLC medium, containing 0.5% yeast autolysate, 1% peptone, 1.5% lactose and 1.0% sodium citrate, yielding approx. 1.2 g DM/l. The other 2 strains were sensitive to citrate and required a

lower concn. (0.5%) of sodium citrate in the APLC medium for max. biomass production. Frozen concentrates of Str. cremoris were prepared from cells grown in 2-8 l. APLC medium for 24 h at 28° C with continuous stirring. Viability and proteolytic and acidifying activities of the cells were unchanged after storage for ⩽12 wk at -30° C. MEG

80

[Biological stability of table olives produced by controlled lactic acid fermentation.]
Pelagatti, O.; Balloni, W.; Materassi, R.
Annali dell'Istituto Sperimentale per la Elaiotecnica 5, 209-222 (1976) [7 ref. It, en, fr, es] [Istituto Sperimentale per la Elaiotecnica, Pescara, Italy]

Ascolana and Intosso variety olives were prepared by fermentation by the procedures described in FSTA (1976) 8 12J1982, stored in 100-l. casks for 6 months, and then for 12 months in 50-l. jars at 27-28° C or at ambient temp., and examined as stated in the above abstr. It is concluded from results tabulated and graphically presented in full detail that controlled fermentation using starter inocula gave highly stable products of improved quality. SKK

81

Inhibition of the microbial activity in extraction juices of beet sugar factories by some antiseptic substances. (In 'Proceedings of the 15th General Assembly' [see FSTA (1978) 10 8L551].) [Lecture]
Matteuzzi, D.; Mantovani, G.; Civerra, G. L.; Vaccari, G.
pp. 117-123 (1975) [11 ref. En, de, fr] [Sugar School 'Serafino Cevasco', Univ. of Ferrara, Ferrara, Italy]

Data are presented on the effectiveness of antiseptics added to raw juice containing added cultures (isolated from commercial diffusers) of Bacillus subtilis (10 strains), Leuconostoc mesenteroides (10 strains) and Saccharomyces cerevisiae (8 strains). Antiseptics studied were Anios BX5 (mixed formalin and a quaternary ammonium compound (QAC)), Auxil A/1 (QAC preparation), formalin, Nalco (QAC), Septosol (containing 70% by wt. iodoacetone) and 2 pure QAC chemicals. 4 raw juices were used, of which 1 was naturally highly contaminated, with tests at 25°, 37°, 45° and 50° C and pH 5.5, 6.5 and 7.5. Doses required to inhibit all growth at 50° C were (p.p.m.) Anios 400-900, Auxil 250-600, Nalco 250-500, formalin 100-300, and Septosol 50-80. In general, the doses required were highest at the optimal temp. and pH for growth of the spp.; lowest effective doses were at 37°/pH 5.5 for Leuconostoc, 45°/pH 5.5 for Bacillus and 37°/pH 7.5 for Saccharomyces. Doses required were also related to numbers of bacteria and individual strains of a sp. Leuconostoc was the most sensitive diffuser organism (except to Anios, which was ineffective). Pure QAC compounds were more effective than commercial preparations. Septosol was the most effective compound against all 3 organisms and over the widest pH range. ELC

82

[Employment of Str. faecium, Str. thermophilus and lactic acid bacteria in Fontina cheese making.]
Battistotti, B.; Bottazzi, V.; Vola, G.
Scienza e Tecnica Lattiero-Casearia 28 (5) 331-341 (1977) [3 ref. It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

Mixed starters containing 1 strain of Streptococcus thermophilus, 3 strains of Str. faecium and 1 thermophilic homofermentative lactic acid bacterium were used in experimental production of Fontina cheese in 2 dairies and 10 small cheesemaking establishments in the Valle d'Aosta, Italy. In the 1st yr of tests (Group A) the starter was added as a freshly developed culture to the milk in the cheesemaking vat (20 ml/100 kg milk), go give 150 000-200 000 cells/ml milk. In the 2nd yr (Group B) the starter was added directly in freeze-dried form (about 1000 million cells of each strain/100 kg milk). Control cheeses were made without addition of starter. In Group A the starter exhibited distinct advantages with regard to prevention of faults due to gas produced by fermentation, but the cheeses were inferior in flavour (rather acid, with too compact consistency). In Group B, however, the cheeses had no flavour defects, nor faults due to gas, and bacterial counts during ripening were very similar to those in control cheeses. ADL

83

[Characteristics of streptococci in Fontina cheese.]
Bottazzi, V.; Battistotti, B.; Dellaglio, F.
Scienza e Tecnica Lattiero-Casearia 27 (6) 463-476 (1976) [12 ref. Fr, It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

296 strains isolated from Fontina cheeses were studied by various biochemical tests. 83% could be readily differentiated into 4 physiological groups: groups (i) (85 strains) and (ii) (42) generally originated from cheeses in the early stage of ripening (⩽60 days), whereas groups (iii) (98) and (iv) (20) were commonly isolated from older cheeses. Using the DNA/DNA hybridization technique employed in earlier work [International Journal of Systematic Bacteriology (1975) 25 (2) 160-172] it was found that group (i) was genetically homologous to Streptococcus thermophilus, group (ii) to Str. lactis and Str. cremoris, and group (iii) to Str. faecium and (in rare cases) Str. faecalis. Group (iv) appeared to contain strains of the genus Pediococcus. The dominance of Str. faecium in the later stage of ripening is discussed. ADL

84

[Importance of a pure culture laboratory in dairy factories.]
Krsev, L.
Mljekarstvo 27 (11) 257-261 (1977) [Sh] [Mljekarsko Poduzece 'Dukat', Zagreb, Yugoslavia]

The author quotes changes in proportions of different strains in Visby, Hansen and own starters that occurred in his factory during subculturing for 6-12 months; the most frequent defects of lactic acid fermentation are discussed and data on bacteriophage appearance in butter cultures are presented. A pure culture laboratory is considered to be essential for proper operation of a dairy factory. SKK

85

[Techniques for viable cell counts of bifidobacteria in fermented milk.]
Shimada, K.; Mada, M.; Mutai, M.; Suzuki, A.; Konuma, H.
Journal of the Food Hygienic Society of Japan [Shokuhin Eiseigaku Zasshi] 18 (6) 537-546 (1977) [11 ref. Ja, en] [Yakult Inst. Microbiol. Res., 1796, Yaho, Kunitachi-shi, Tokyo, Japan]

Media for viable cell counts of bifidobacteria in fermented milk were investigated. The differential calculation of viable cells of bifidobacteria and lactic acid bacteria was completely established from mixed cultures of 2 or 3 spp. using modified Rogosa's selective agar together with BCP plate count agar. TM

86

The role of cyclic adenosine 3',5'-monophosphate in the lactose metabolism of Streptococcus lactis.
Ratliff, T. L.
Dissertation Abstracts International, B 38 (5) 2050: Order No. 77-23319, 96pp. (1977) [En] [Univ. of Arkansas, Fayetteville, Arkansas 72701, USA]

Prostaglandin E_1 (PGE_1) increased the intracellular concn. of cAMP in Str. lactis C2 cells by stimulating adenyl cyclase. Growth rate of PGE_1-treated cells was greater than that of untreated cells. PGE_1 treatment also stimulated substrate transport, extracellular proteolytic activity and lactic acid production. The increase in lactic acid production by PGE_1-treated cells of Str. lactis suggests that alterations in cAMP concn. may be of benefit to the dairy industry. MEG

87

[Characteristics of lactic acid bacteria in natural whey cultures. I. Taxonomy, morphology and β-galactosidase and LDH activities.]
Bottazzi, V.; Bersani, C.; Sarra, P. G.; Magri, M.
Scienza e Tecnica Lattiero-Casearia 28 (6) 430-442 (1977) [14 ref. It, en] [Istituti di Microbiol., Univ. Cattolica, Piacenza, Italy]

Taxonomic and morphological studies of whey cultures used as starters in 2 Grana cheese production areas indicated that the most common bacteria in the cultures were Lactobacillus helveticus, L. fermentum and L. lactis. There were considerable morphological differences between the bacteria isolated from the various cultures, and it was impossible to determine which morphological types were most suitable for cheesemaking purposes. β-galactosidase activity (in toluene-treated cells) also differed widely among strains, ranging from 0.17 to 1.42 μmol o-nitrophenol liberated/min [method of Schifsky & McKay, FSTA (1975) 7 8P1862]. Lactate dehydrogenase activity in cell-free extracts, as determined on the basis of pyruvic acid reduction by the method of Anders et al. [Australian Journal of Dairy Technology (1970) 25, 73], averaged 5800, 1800 and 1370 units/mg protein for L. lactis, L. helveticus and L. fermentum, resp. (each unit corresponding to the amount of enzyme which causes a change of 0.100/min in absorbance at 340 nm). ADL

88

The use of frozen concentrated cultures of mesophilic lactic acid bacteria as a starter in cheese making.
Libudzisz, Z.; Piatkiewicz, A.; Jakubowska, J.
Acta Alimentaria Polonica 3 (4) 433-443 (1977) [28 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiol., Politechnika, Lodz, Poland]

Frozen concentrates of 11 strains of lactic acid bacteria, used in conventional cheese starters, were studied (4 strains of Streptococcus lactis, 2 of Str. cremoris, 2 of Str. diacetilactis and 3 of Lactobacillus casei). In initial tests it was established that 0.01% of a frozen concentrate (with a cell density of approx. 10^{11}/g) of monocultures of the streptococci gave growth and acidification in milk similar to that of conventional liquid starters. In pilot plant experiments, Edam cheeses were manufactured from 8 combinations of frozen concentrates of the above monocultures added direct to the cheese vat. With the first 4 combinations, the mixed concentrate was added at 0.012%, and L. casei represented 24% of the total concentrate; in the other 4 combinations, the concentrate was added at 0.008% and the L. casei content was reduced to 15%. The frozen starter concentrates were also used on an industrial scale for the manufacture of Podlaski-type cheese. In both sets of experiments the cheeses manufactured with the frozen starters were similar to those made with conventional starters. It is recommended that the thawed concentrates should be activated in sterile skim-milk for 1.5 h at 30° C before addition to the cheese vat. MEG

89

Enumeration of viable Lactobacillus acidophilus organisms in dairy products.
Speck, M. L.
Journal of Food Protection 41 (2) 135-137 (1978)

[8 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Pasteurized low-fat milk to which is added L. acidophilus has now become a product of major volume on the US market. The product contains millions of L. acidophilus/ml and is considered to be in the general category of cultured milk products for application of regulatory monitoring. There is a growing interest in developing standards for allowable min. numbers of L. acidophilus in such products at point of sale. This can be accomplished best by use of a medium selective for lactobacilli such as Lactobacillus Selection Agar; non-selective media, such as APT agar, can also be used. The latter would provide less assurance that the counts were due to lactobacilli. The non-selectivity of APT, however, usually results in higher counts of L. acidophilus. There is need for application of accurate monitoring of such products to ensure the numbers as well as the identity of the culture used as the milk supplement. AS

90

[Establishment of biochemical profiles for lactic streptococci: importance for industrial starters.]

Chazaud, M.-T.

Revue Laitiere Francaise No. 361, 77-80 (1978) [13 ref. Fr, en] [Lab. de Microbiol., 4-6 Rue Ledru, 63000 Clermont-Ferrand, France]

On the basis of biochemical profiles of lactic streptococci from farm and industrial milks, Streptococcus cremoris, Str. lactis and Str. diacetilactis could be divided into 15, 35 and 13 physiological groups, resp. Only 1 Str. cremoris strain was isolated from farm milk. Histograms showed that the groups of Str. diacetilactis and Str. lactis most commonly found in farm milk differed from those most commonly found in industrial milk. Of 3 physiological groups (Str. lactis L_{16}, Str. diacetilactis D_4 and D_9) generally represented in farm cheeses, only one (Str. diacetilactis D_4) was found in industrial milk. CDP

91

[Effect of starter composition on structural and mechanical properties and syneresis of acid/rennet coagulum.]

Belousov, A. P.; Shalygina, A. M.; Krylova, V. P.

Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 16, 27-31, 61, 67 (1974) [9 ref. Ru, en] [VNIIMiSP, Uglich, USSR]

Skim-milk samples were pasteurized at 72° C for 20 s. 1% of starter, 20 g $CaCl_2$/100 l. milk, and a quantity of rennet required for coagulation within 30 min (determined for each series of experiments) were added to each sample. The samples were incubated for 30 min at 30° C and shearing stress of coagulum and syneresis (centrifugation) were measured. The 5 starters used were: (i) the Uglich starter consisting of Streptococcus lactis (SL), Str. cremoris (SC), Str. paracitrovorus (SP), and Str. diacetilactis (SD) with 35-50% of total as aroma-forming microorganisms (control); (ii) 50% SC + 40% SD + 10% SP; (iii) 50% SL + 40% SD + 10% SP; (iv) 50% SC + 50% SD; or (v) 50% SC + 50 Str. acetoinicus. It is concluded from data tabulated for biochemical characteristics of (i)-(v) and from syneresis data presented graphically that (i), (v) and (iii) produced the firmest coagula in that order, while (ii) and (iv) coagula were less firm; and that most (88-89%) of whey was separated from (i), (iii) and (v) coagula by centrifugation for 15 min, while (ii) and (iv) coagula required 20-25 min for this purpose. It is considered that the more uniform separation of whey with (ii) and (iv) is beneficial in cheese production. SKK

92

[Comminuted meat.]

Labots, H.

Voedingsmiddelentechnologie 10 (19) 9 (1977) [16 ref. Nl] [Nederlands Centrum voor Vleestech., Zeist, Netherlands]

The popularity of comminuted meat products in the Netherlands is briefly discussed, and legal requirements concerning the use of SO_2, refrigeration, bacteriological quality, freshness of raw materials, and cleaning of processing equipment are considered. Improvement of the shelf-life of minced meat products by vacuum packaging or inoculation with lactic acid bacteria is also briefly discussed. AJDW

93

The use of the A.P.I. lactobacillus system for the characterization of pediococci.

Dolezil, L.; Kirsop, B. H.

Journal of Applied Bacteriology 42 (2) 213-217 (1977) [10 ref. En] [Brewing Res. Foundation, Lyttel Hall, Nutfield, Redhill, Surrey, UK]

77 strains of pediococci, comprising 49 reference strains and 28 new isolates from spoiled beer and brewing yeast samples were used to test the A.P.I. lactobacillus system for the characterization of pediococci. The A.P.I. identification system involved inoculating tubes, containing a dried specific substrate, with cells in the MRS (oxoid) identification medium, and incubation at 30° C. During incubation, reactions were recorded at 3, 6, 24 and 48 h intervals. Out of the 49 biochemical reactions tested, 39 indicated fermentation of a specific carbohydrate, based on acid production and change of colour of an indicator. The additional reactions included inhibition by Teepol and by NaCl, as well as tests for arginine dihydrolase, β-galactosidase and acetoin production. Manufacturers recommend 48 h as max. incubation time; however, with slow growing strains, positive results can be delayed by $\leqslant 7$ days. Adjustment of cell concn. and conditions of inoculum growth may overcome this problem. Upper concn. of cells was limited to 5×10^9/ml. Results were positive for all strains with galactose, mannose, cellobiose, and

trehalose. The A.P.I. test system for characterization of pediococci was concluded to be an acceptable procedure which offers considerable advantages in simplicity and reproducibility. SP

94

[The malolactic microflora of musts and wines of Valais Canton, Switzerland. I. Lactobacilli and pediococci.]

Maret, R.; Sozzi, T.

Annales de Technologie Agricole 26 (3) 255-273 (1977) [18 ref. Fr, en] [Dep. de Developpement Tech., Societe d'Assistance Tech. pour Produits Nestle S.A., Lausanne, Switzerland]

Studies were conducted on the malolactic microflora of Valais musts and wines at various stages of fermentation; freshly-pressed must, wine undergoing alcoholic fermentation, wine undergoing malolactic fermentation, and wine in which malolactic fermentation is complete. A total of 32 strains was isolated. These could be classified into the following groups: Lactobacillus casei (homofermentative); L. plantarum (homofermentative); L. brevis (heterofermentative); and Pediococcus cerevisiae and P. pentosaceus (homofermentative). Homofermentative lactobacilli seem to be eliminated by the end of alcoholic fermentation, leaving a residual microflora of heterofermentative lactobacilli and pediococci. Biochemical tests for differentiation of malolactic organisms are briefly discussed. AJDW

95

[Effect of sorbic acid for preservation of lactic beverage.]

Matsumoto, M.; Jinbo, K.; Takeba, K.; Murakami, F.; Murakami, H.; Haruta, M.

Annual Report of Tokyo Metropolitan Research Laboratory of Public Health 27 (1) 146-148 (1976) [3 ref. Ja] [Tokyo Metropolitan Res. Lab. of Public Health, 24-1 Hyakunincho 3 chome, Shinjuku-ku, Tokyo, 160 Japan]

96

[Adaptation of a thermophilic lactobacillus to growth in whey.]

Kalinina, V. I.; Bogatyreva, T. G.; Polandova, R. D.

Khlebopekarnaya i Konditerskaya Promyshlennost' No. 9, 19-20 (1977) [Ru] [Vses. Nauchno-issled. Inst. Khlebopekarnoi Promyshlennosti, USSR]

Lactobacillus delbrueckii was studied; the whey was used as a taste and aroma improver in the manufacture of wheat bread. L. delbrueckii strain 30 was used to obtain strain 30-2, adapted to 25% whey. Stability of the new strain to whey, to temp. variations and to acidity, was studied. The new cells were larger in size; 1 to 2-7.0 μm, vs. 0.5 to 1.0-6.0 μm for the initial strain. The composition of essential amino acids and other growth factors in whey is tabulated. After tests under manufacturing conditions, the use of strain 30-2 is recommended in the preparation of a liquid ferment from whey. STI

97

Kinetic analysis of batch and continuous culture of Streptococcus cremoris HP.

Rogers, P. L.; Bramall, L.; McDonald, I. J.

Canadian Journal of Microbiology 24 (4) 372-380 (1978) [23 ref. En, fr] [Div. of Biol. Sci., Nat. Res. Council of Canada, Ottawa, Ontario K1A OR6, Canada]

The growth of Str. cremoris on a semi-defined medium was studied at initial lactose concn. of 0.2-5.0% in batch culture, and in lactose-limited chemostat cultures at 0.5% lactose. Kinetic analysis of the batch data, using statistical techniques, indicated the importance of lactose limitation and lactic acid inhibition of the growth of Str. cremoris. A model for the biomass production, lactose utilization, and lactic acid production in batch culture was proposed. In continuous culture, it was found that steady state populations were maintained at higher dilution rates ($D = 0.6\text{-}0.7\ h^{-1}$) than the max. predicted by batch culture ($0.56\ h^{-1}$). No evidence for a selection of fast-growing mutants was obtained. Copious growth adhering to the walls of the fermentor occurred very rapidly at higher dilution rates and this undoubtedly affected steady-state growth and wash-out and, as a consequence, the apparent max. dilution rate. AS

98

Lactostrepcins - acid bacteriocins produced by lactic streptococci.

Kozak, W.; Bardowski, J.; Dobrzanski, W. T.

Journal of Dairy Research 45 (2) 247-257 (1978) [17 ref. En] [Dep. of Pharmaceutical Microbiol., Med. Acad., Warsaw, Poland]

All 47 non-nisin producing strains of Streptococcus lactis and 12 out of 13 strains of Str. lactis subsp. diacetylactis examined produced bacteriocins, for which the term lactostrepcins is suggested. 7 strains of Str. cremoris produced no bacteriocins active against 3 lactic streptococci strains used as indicators. The strains examined were divided into 3 groups: (i) those producing lactostrepcins active against only 1 streptomycin-resistant mutant of Str. lactis 60 indicator strain; (ii) those producing lactostrepcins active against all 3 indicator strains; (iii) those not producing lactostrepcins. The lactostrepcins were sensitive to various proteolytic enzymes and to phospholipase D, but retained full or partial activity after dialysis. Most of the bacteriocins studied were fully active only within the pH range 4.2-5.0 and were reversibly inactivated at pH 7.0 or 8.0. Results suggest the occurrence of 4 different lactostrepcins. Lactostrepcins produced by all group (i) strains were the same, but there were differences among those produced by group (ii) strains. Lactostrepcins killed some β-haemolytic streptococci and some strains of Lactobacillus helveticus. 1 of the lactostrepcins was also active against certain

Leuconostoc strains, but not against others, nor against L. helveticus or other Gram-positive bacteria. [See FSTA (1977) 9 12P2143.] AS

99

The effect of certain factors on the behaviour of some lactic-acid cultures.
Naghmoush, M. R.; Girgis, E. S.; Guirguis, A. H.; Fahmi, A. H.
Egyptian Journal of Dairy Science 5 (2) 167-173 (1977) [14 ref. En, ar] [Food Sci. Dep., Cairo Univ., Cairo, Egypt]

Pure cultures of Streptococcus lactis, Str. thermophilus and Lactobacillus bulgaricus were grown in a basal milk medium with the following treatments or supplements: (i) addition of 1% Difco yeast extract, (ii) neutralization with 25% marble grits; (iii) medium buffered to pH 6.9; aseptic additions of (iv) 30 mg vitamin E/100 g, (v) 0.5% vitamin C, (vi) 0.01% Tween 80 or (vii) 1% sheep serum to the sterilized medium. Highest total cell count was obtained with (i) for Str. lactis, with (ii) for Str. thermophilus and with (ii), (v) and (vii) for L. bulgaricus. Viable counts were highest with (vi) for all 3 microorganisms. Activity (i.e. acidity produced in 3.5 h at 37° C) of the 2 streptococci was highest in medium (i); that of L. bulgaricus was highest in the control medium. Max. acid production by all 3 microorganisms occurred in medium (i) or in the control medium. Activity of these 3 organisms appeared to be independent of the total and viable counts but was related to the titratable acidity. MEG

100

[Use of a micromethod (API System) for identification of lactic streptococci and leuconostocs.]
Guy, P.; Chouteau, J.; Buissiere, J.
Annales des Falsifications et de l'Expertise Chimique 70 (760) 643-653 (1977) [30 ref. Fr] [Lab. ERCEM, Hameau des Charmettes, 38120 Saint-Egreve, France]

49 biochemical characteristics of (i) 12 strains of Streptococcus lactis, (ii) 16 of Str. cremoris, (iii) 7 of Str. lactis subsp. diacetylactis (iii), 5 of Leuconostoc cremoris, 4 of Leuc. paramesenteroides, 11 of Leuc. dextranicum and 4 of Leuc. mesenteroides were determined using the API System and a standardized inoculum. Leuconostocs differed from the streptococci by producing gas from glucose; none of the leuconostocs contained arginine dihydrolase. (ii) could be differentiated from (i) and (iii) by its inability to ferment maltose, ribose, arbutin, esculin, salicin and trehalose, and by the absence of arginine dihydrolase. (iii) differed from (i) in that it produced gas and diacetyl from citrate. Differentation of Leuconostoc spp. according to their ability to ferment arabinose, xylose or maltose, production of gas and/or diacetyl from citrate and formation of dextran is also described. The stable biochemical characteristics of different strains enabled them to be identified by the API system. The technique can also be used for selecting suitable starter strains. MEG

101

[Fat-free fermented products, high in dry matter.]
Borisova, V. G.; Kriventsova, V. F.; Fialkov, A. N.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 5, 145-147 (1977) [4 ref. Ru] [Vologodskii Molochnyi Inst., Vologda, USSR]

Growth of lactic acid bacteria in high DM skim-milk, and the accumulation of metabolic products during fermentation of milk were studied. Fat-free milk was concentrated in a vacuum evaporator to 13-17, 20 and 23% DM. There was a relatively high development of longer-lived bacteria in milk containing 13-17% DM. The increase in milk DM caused changes in titratable acidity and in the accumulation of lactic acid, volatile acids and diacetyl; milk with 13-17% DM can be used to make fermented milk products. STI

102

[Improved method for the detection of Streptococcus agalactiae in milk.] Eine verbesserte Methode zum Nachweis von Streptococcus agalactiae in Milch.
Meyer, B.; Hess, E.; Beissner, H.
Milchwissenschaft 33 (1) 14-15 (1978) [11 ref. De, en] [Vet.-Bakteriologisches Inst., Univ. Zürich, Winterthurer Strasse 270, CH-8057 Zürich, Switzerland]

The authors use Trypticase Soya Agar plates with 6% calf blood, Congo red and staphylococcal toxin inoculated with 0.02 ml whole milk under test for routine detection of Str. agalactiae. The reliability of the method was checked using 210 randomly selected strains of CAMP-positive and aesculin-negative streptococci, all identified serologically as belonging to Lancefield group B, and 193 (92%) hydrolysing sodium hippurate. In tests with 15 260 milk samples, group B streptococci were isolated from 2950 samples, but 140 (approx. 5%) of these strains gave no growth on the toxin plates after 72 h, they were found to require CO_2 for growth (optimum, 1%); and for Str. agalactiae strains with this peculiarity, use of toxin plates at increased CO_2 tension is recommended. SKK

103

[Fermented milk products in nutrition.]
Thomas, T. D.
Nordisk Mejeriindustri 5 (4) 149, 152-153 (1978) [Da] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

The author reports on his research into mesophilic lactic streptococci (especially Streptococcus cremoris) used in production of Cheddar cheese and casein in New Zealand. His research has been concentrated on 3 main areas: conversion of lactose to lactic acid, with special regard to factors which may interfere with this

process and result in other types of conversion (e.g. to acetic acid, formic acid or alcohol); proteolytic activity of lactic acid bacteria, and its relationship with bacterial growth and production of flavour compounds; and, finally, bacteriophage infection of lactic acid bacteria and ways of controlling it. A method of bacteriophage control involving deliberate addition of bacteriophages (in filtered whey from the previous production run) to Str. cremoris cultures for casein manufacture has given promising results, producing bacteria which can grow in the presence of phages. The same method has also been used successfully for the Indian fermented milk product dahi. ADL

104

[Identification of groups of strains of homofermentative thermophilic lactobacilli similar in phenotypic and genotypic characteristics and present in natural whey cultures.]
Bottazzi, V.; Vescovo, M.; Dellaglio, F.
Annali di Microbiologia ed Enzimologia **26**, 187-196 (1976) [17 ref. It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica di Piacenza, Piacenza, Italy]

Using microscopy and cultural, serological and DNA homology tests, 4 groups of thermophilic homofermentative lactobacillus strains, isolated from natural whey cultures used in Grana cheese manufacture, were studied. 2 of these groups were identified as consisting resp. of Lactobacillus helveticus including L. jugurti, its maltose-negative variant, and of L. lactis and a few strains of L. bulgaricus; the other 2 groups could not be identified. The 4 groups occurred in wheys irrespective of origin (no difference between Padano and Parmigiano-Reggiano production zones). SKK

105

[Effect of various additions of cultures on the ripening of Emmental cheese.] Einfluss der Kulturenschüttmenge auf die Reifungsvorgänge im Emmentalerkäse.
Steffen, C.; Nick, B.
Schweizerische Milchwirtschaftliche Forschung **7** (1) 5-8 (1978) [15 ref. De, fr, en] [Eidgenössische Forschungsanstalt für Milchwirtschaft, Liebefeld-Bern, Switzerland]

With increase in added culture (using 0.02, 0.10 and 1.5% additions to milk) the initial rate of formation of lactic acid increased, but the proportion of the acid present in the D(-)form decreased. By 15 days, however, both total and D(-) acidities had attained normal levels independently of the quantity of culture employed. Increasing the amount of culture added lowered the activities of β-galactosidase and lactate dehydrogenase and raised that of aminopeptidase. At the highest level of added culture, and thus also of aminopeptidase activity, the quality of the cheese was somewhat impaired. GTP

106

[Characteristics of lactic acid bacteria in natural whey cultures. II. Total proteolytic activity on caseins.]
Vescovo, M.; Bottazzi, V.; Rastelli, A.
Scienza e Tecnica Lattiero-Casearia **29** (1) 7-12 (1978) [11 ref. It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

Bacterial strains isolated from whey cultures used as starters in Grana cheese production were tested for their proteolytic activity on casein by the following methods: (i) direct assessment after 24 h incubation in milk, by a modification of the Hull method [Journal of Dairy Science (1963) **46** (4) 337]; (ii) colorimetric test with ninhydrin after 6 h incubation of cell extracts in isoelectric casein solution; (iii) detn. on azo-casein, measuring the variation in absorption at 440 nm; (iv) detn. on $^{14}CH_3$-labelled casein; (v) detn. on ^{125}I-casein. Proteolytic activity varied widely both among the heterofermentative and among the homofermentative strains. Method (iv) appeared to be the most sensitive for assessing proteolytic activity. For 3 strains (B23, 13 C21 and MAU 51) this method indicated very high proteolytic activity (63.1-67.7% of casein hydrolysed). Other strains, however, showed virtually no proteolytic activity. ADL

107

Ultraviolet light-induced mutants of Streptococcus lactis subspecies diacetylactis with enhanced acid- or flavor-producing abilities.
Kuila, R. K.; Ranganathan, B.
Journal of Dairy Science **61** (4) 379-383 (1978) [23 ref. En] [Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal 132001, India]

A strain of Str. lactis subsp. diacetilactis S_1, isolated from fresh milk, was exposed to 7200 ergs/mm^2 of UV radiation. Over 8100 colonies surviving from 7.4×10^6 cells exposed to radiation were screened on citrate agar for detection and isolation of mutants with increased flavour and/or acid production. Of the survivors, 960 were type-I mutants that exhibited clear zones on citrate agar after 18 h (presumed to be high diacetyl producers), and 288 were type-II mutants which did not exhibit clear zones on citrate agar for up to 72 h (high acid producers). Type-II mutants produced an average of 0.93% titratable acidity (TA) which was 34% more than the 0.69% of the parent. Reduction in TA (56% less) was considerable in type-I mutants, compared with the parent culture. Diacetyl + acetoin production by type-I mutants was 137.9 p.p.m. which was 4.5 × that of the parent strain. Acetaldehyde production in the mutants varied from 1.5 to 34.5 p.p.m. (parent culture 3.0 p.p.m.). The mutants with increased acid and high acetoin + diacetyl production were stable after 50 subcultures in milk. AS

108

[Antimicrobial activity of thermophilic lactobacilli.] Antimikrobielle Aktivität thermophiler Laktobazillen.
Spillmann, H.; Puhan, Z.; Banhegyi, M.
Milchwissenschaft 33 (3) 148-153 (1978) [33 ref. De, en] [Lab. für Milchwissenschaft, Inst. für Lebensmittelwissenschaft, Eidgenössische Tech. Hochschule, Zürich, Switzerland]

Neither antimicrobial activity nor the production of antimicrobial metabolites could be detected in commercial yoghurts or in cultures of strains of Lactobacillus acidophilus, L. casei, and L. helveticus, and of 1 strain of L. acidophilus and 1 of L. bulgaricus said to produce inhibitory substances. Bacillus subtilis, Escherichia coli, Pseudomonas fluorescens and Staphylococcus aureus were used as test organisms. Addition of several acids to skim-milk showed repeatedly that only lactic acid had an inhibitory effect on the test organisms. ASe

109

Partial characterization of Lactobacillus bulgaricus isolated from yoghurt.
Peake, S. E.; Stanley, G.
Journal of Applied Bacteriology 44 (2) 321-323 (1978) [7 ref. En] [Unigate Tech. Cent., Bradford-on-Avon, Wiltshire BA15 1DH, UK]

A bacteriophage of L. bulgaricus (Unigate strain 1088) was isolated from a batch of yoghurt showing slow acid production. Plaque formation was demonstrated using double layer plates of MRS agar plus Ca. Phages in an acid whey prepared from infected yoghurt were purified by repeated differential centrifugation, resuspended in ammonium acetate buffer (approx. 1×10^9 plaque forming units (pfu)/ml) and stained with uranyl acetate for electron microscopy. The phages had hexagonal heads 56-62 nm in diam. and tails 205-215 nm long. Tails appeared to have a base plate assembly and showed crossbar structures of unknown function and of varying numbers (up to 10) along their length. Slowness of yoghurt due to phage has not previously been reported in the UK and the authors suggest that this phage may be temperate for another strains of L. bulgaricus with L. bulgaricus 1088 serving as an indicator strain. It is further suggested that systems of protection such as used for cheese starters should be applied to yoghurt starters. FLD

110

Nonspecific staining of a Lactobacillus by Salmonella fluorescent antibodies.
Tharrington, G., Jr.; Ashton, D. H.; Hatfield, J. R.; Fry, F. H.
Journal of Food Science 43 (2) 548-552 (1978) [16 ref. En] [Hunt-Wesson Foods, Inc., 1645 W. Valencia Drive, Fullerton, California 92634, USA]

Salmonella fluorescent antibody (FA) positives but cultural negatives were encountered in pasta samples. Salmonella FA positives were caused by an organism identified as a Lactobacillus plantarum designated strain GT. Brilliant green incorporated into lactose broth eliminated the false positives. The organism reacted to +3 to +4 (strongly to intensely fluorescing) with 3 commercially prepared FA Salmonella poly antisera and with staphylococcal, streptococcal and Pseudomonas FA antisera. The organism also agglutinated in response to a variety of non-FA Salmonella polyvalent antisera (poly A-1, poly D, poly C). L. plantarum/GT absorption of FA Salmonella poly antiserum resulted in reduction of the false positive reaction from +4 to +1. L. plantarum/GT absorption of FA staphylococcal and FA streptococcal antisera resulted in reduction (+4 to +1) in false positive reaction. Fluorescein isothiocyanate (FITC)-conjugated normal rabbit immunoglobulin G (IgG) stained L. plantarum/GT and Staphylococcus aureus +4, but Salmonella thompson was not stained. FITC alone produced no false positive staining of the 3 test organisms. These findings strongly suggest that the FA false positive reaction of L. plantarum/GT results not from the organism possessing homologous antigens with Salmonella, but is a consequence of L. plantarum/GT cell surface possessing affinity for the nonantigenic region of the IgG molecule in FA antisera. The data suggest that the reaction is analogous to the nonspecific affinity between S. aureus cell wall protein A and the nonantigenic Fc portion of the IgG molecule. IFT

111

Effect of disinfectants on dextran producing Leuconostoc bacteria. (In 'Proceedings of the Fifth Joint Convention' [see FSTA (1978) 10 10L702].) [Lecture]
Bhatnagar, R.; Prabhu, K. A.
pp. G95-G99 (1975) [13 ref. En] [Biochem. Div., Nat. Sugar Inst., Kanpur, India]

Data is presented on the action of disinfectants on dextran producing Leuconostoc bacteria (whole cells and cell free extracts) as a method of controlling deterioration of sugar cane juice by the formation of gummy substances. In whole cell studies, mercuric chloride, copper sulphate, formaldehyde, gention violet, thymol, sodium metabisulphite and SO_2 at 100 p.p.m. were effective, giving 100% inhibition of both dextran synthesis and growth. Penicillin, ammonium bifluoride and electrolytic chlorine showed more inhibition (60-80%) of growth and less of dextran synthesis (30-50%). Enzyme studies on dextran sucrase revealed that penicillin, tetracycline, and chloramphenicol at 50 to 100 p.p.m. had no action on the enzyme, and mercuric chloride copper sulphate, Busan, formaldehyde Leuvotex and Sanitrol at 50 and 100 p.p.m. were less effective than on cell cultures. SP

112

Preliminary studies of the continuous fermentation of dextran. (In 'Proceedings of the Fifth Joint Convention' [see FSTA (1978) 10 10L702].) [Lecture]
Bhatnagar, R.; Prabhu, K. A.

pp. G91-G94 (1975) [17 ref. En] [Biochem. Div., Nat. Sugar Inst., Kanpur, India]

Preliminary studies on the continuous fermentation of dextran in modified Stacey's medium using a purified culture of Leuconostoc bacteria isolated from contaminated juices are described. Continuous fermentation feed rate was calculated from the growth curves of the batch fermentation process and validity of the process based on the predetermined calculated feed was examined experimentally. A feed rate of 12 ml/h in a well agitated medium at 23° C ± 1° C was found satisfactory and a 48 to 50 h cycle was obtained. Levels of turbidity, dextran and sugar remained nearly the same as in normal batch fermentation. Sugar utilization rate was 0.85-0.95 g/100 ml/day with corresponding production of 0.27-0.28 g dextran/100 ml/day. SP

113

Process for preparing food products containing lactic acid bacteria-fermented products of a cereal germ.

Hagiwara, Y.; Tetsuji, M.; Morimasa, Y. (Japan Natural Food Co. Ltd.)

United States Patent 4 056 637 (1977) [En]

Lactic acid bacteria (Lactobacillus bulgaricus, L. acidophilus, Streptococcus lactis or Str. thermophilus) are cultured in a medium containing an aqueous extract of cereal germ as a main ingredient, to a sufficient level to produce a palatable fermented food product. The aqueous extract of cereal germ is obtained by hot water extraction in the presence of a starch hydrolase. EJM

114

Purification and characterization of Lactobacillus bulgaricus diaphorase.

Yajima, T.; Yokokura, T.

Agricultural and Biological Chemistry 42 (3) 659-660 (1978) [9 ref. En] [Yakult Inst. for Microbiol. Res., 1796 Yaho, Kunitachi, Tokyo, Japan]

115

Study on casein degradation by a gamma-radiation induced mutant of Lactobacillus bulgaricus.

Jasjit Singh; Kuila, R. K.; Ranganathan, B.

Journal of Food Science 43 (1) 278, 280 (1978) [12 ref. En] [Nat. Dairy Res. Inst., Karnal 132001, India]

Results of starch gel electrophoresis of degraded whole casein by a γ-radiation induced mutant of L. bulgaricus showed that the mutant degraded whole casein much faster than the parent culture. IFT

116

Fatty acid composition of various lipid fractions of Streptococcus lactis grown at low temperature.

Umemoto, Y.; Sato, Y.

Agricultural and Biological Chemistry 42 (2) 213-219 (1978) [21 ref. En] [Dep. of Food Sci. & Tech., Fac. of Agric., Nagoya Univ., Nagoya 464, Japan]

Cells of S. lactis grown at 10° C and harvested were disintegrated and lyophilized for extraction of total lipids to clarify the role of bacteria in Cheddar cheese ripening. The extracted lipids were separated into neutral and complex lipids by silicic acid column chromatography and recovered to determine their yields. Complex lipids were fractionated into glycolipids and phospholipids by silicic acid column chromatography and on silicic acid-impregnated papers. Total lipid contents in dried cells amounted to about 5% and the ratio neutral:complex lipids was about 20:80 (on tomato-dextrose broth), irrespective of growth temp. (10° or 30° C). 7 components in complex lipids were separated into 3 glycolipids and 4 phospholipids on the chromatogram. Variations in yields of the components due to changes in growth medium composition were found. It was found that glycolipid contents of bacterial cells were considerably higher than phospholipid contents. The fatty acid composition of neutral lipids and phospholipids was clearly affected by growth temp., and at 10° C, unsaturated acids (palmitoleic and vaccenic) content increased and lactobacillic acid content decreased with respect to growth at 30° C. AS

117

Lipolysis by intracellular lipase of Streptococcus lactis against its neutral lipids obtained by growth at low temperature.

Umemoto, Y.; Sato, Y.

Agricultural and Biological Chemistry 42 (2) 221-225 (1978) [10 ref. En] [Dep. of Food Sci. & Tech., Fac. of Agric., Nagoya Univ., Nagoya 464, Japan]

Lipolytic activities of intracellular lipase obtained from S. lactis 527 cells grown at 30° C were determined using bacterial neutral lipids extracted from cells grown at 10° and 30° C. The amounts of free fatty acids liberated from lipids by lipase were in the order: 30° C neutral lipid > 10° C neutral lipid > triolein > intracellular membrane fraction. Glycerides hydrolysed partially by lipase were detected by TLC and were composed of 1,3- and 1,2-diglycerides, fatty acids and unhydrolysed triglycerides. Fatty acids liberated from neutral lipids by lipase were determined by gas chromatography. The major component liberated from 10° C lipid was lactobacillic acid (cy-C19), with vaccenic acid as a minor component, whereas the major component liberated from 30° C lipid was vaccenic acid, with palmitoleic and cy-C19 as minor components. [See also preceding abstr.] AS

118

Direct observation of fine structures of bacteria in ripened Cheddar cheese by electron microscopy.

Umemoto, Y.; Sato, Y.; Kito, J.

Agricultural and Biological Chemistry 42 (2) 227-232 (1978) [16 ref. En] [Dep. of Food Sci. &

Tech., Fac. of Agric., Nagoya Univ., Nagoya 464, Japan]

This investigation was undertaken to clarify ultrastructure of Cheddar cheese texture and morphological changes in lactic acid bacteria firmly embedded in cheese. Fine structures of Cheddar cheese ripened for 5 months, sliced into ultra-thin sections, were observed with an electron microscope. Cheese bacteria were often found crowded around larger fat globules in limited regions of cheese. Shapes of living cells were short and rod-like. Cell walls, cross-wall sections and several organelles were distinctly observed in living cells. Intact cells were clearly differentiated from dead cells by morphological changes. The occurrence of cell wall lysis characterized dead cells, and segments of cell walls were released from cells and curled after lysis. Unit membranes of protoplast were also maintained without bursting. Moreover, protrusion of cell contents from protoplasts was also found in the cells from which parts of cell wall had been released. [See also preceding abstr.] AS

119

Differentiation of lactic streptococcal phages.
Jarvis, A. W.
XX International Dairy Congress E, 553 (1978) [3 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Lactic streptococcal phages could be differentiated by electron microscopy and neutralization by specific antisera into 5 main morphological groups. When they were further subdivided on the basis of serological tests, these subgroups showed a good correlation with the host range. Serum blocking power determinations [De Mars, Virology (1955) **1**, 83] could be used to show serological identity/non-identity of phages. [See FSTA (1978) **10** 10P1408.] DMK

120

A procedure for harvesting lactic streptococci from milk.
Thomas, T. D.; Turner, K. W.
XX International Dairy Congress E, 459 (1978) [2 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

2 strains of Streptococcus lactis and 9 of Str. cremoris were grown in high quality unsterilized reconstituted skim-milk (9.5% TS) which had been centrifuged (10 000 × g_n for 5 min) and buffered with autoclaved disodium glycerophosphate (0.075M). Cultures harvested at pH 5.9 contained about 10^9 colony forming units/ml; washing sedimented cells in orthophosphate buffer containing $CaCl_2$ removed the small contamination by milk protein. Centrifugation at 10 000 × g_n for 1 min sedimented >90% of the bacterial cells in 7 of the strains tested. [See also FSTA (1977) 9 7P1203.] [See FSTA (1978) **10** 10P1408.] DMK

121

[Factors influencing the activity of starter cultures in milk. II. Addition of growth factors.]
Kriel, J. B.; Holzapfel, W. H.; Wood, L. A.
South African Journal of Dairy Technology **10** (1) 13-16 (1978) [18 ref. Af, en] [Anim. & Dairy Sci. Res. Inst., Irene 1675, South Africa]

The addition of yeast extract (>0.1%) to milk resulted in more rapid acid production by 2 cultures of Streptococcus cremoris (E8 and EB6) than when guanine was added at the same concn. At concn. <0.1%, guanine stimulated acid production more than yeast extract. Guanine (0.1%) + yeast extract (≤0.5%) added to milk stimulated acid production more than yeast extract alone at the same concn. With higher concn. of yeast extract (>0.5%) the addition of guanine had no beneficial effect above that obtained with yeast extract alone. Addition of yeast extract + 2% phosphate buffer further increased the activity of E8 and EB6. The same trend was found with E8 in milk containing guanine and buffer, but not with EB6, which had a lower activity in this medium than in milk with guanine only. [See FSTA (1978) 10 5P681 for part I.] AS

122

Specific features in the selection of mesophilic lactic acid streptococci for continuous starter production.
Bannikova, L. A.; Evseeva, S. D.; Zadoyana, S. B.
XX International Dairy Congress E, 510-511 (1978) [2 ref. En] [All-Union Res. Inst. of the Dairy Ind., Moscow, USSR]

For continuous starter production, combinations of 1 strain each of Streptococcus lactis and Str. acetoinicus are recommended. Selected strains should have low heterogeneity, be resistant to virulent phages and have ≤20% difference in specific growth rate. [See FSTA (1978) **10** 10P1408.] MEG

123

Evaluation of the suitability of methods of immunizing cows for production of antiphage antibodies in the milk.
Strzalkowska-Domanska, M.; Grzybowski, G.; Rabek, A.
XX International Dairy Congress E, 570 (1978) [3 ref. En] [Inst. of Dairy Ind., Warsaw, Poland]

8 cows were inoculated intramuscularly with a monovalent suspension of phages for Streptococcus lactis, Str. diacetilactis and Str. cremoris. The antigen was a lysate with Freund's adjuvant; it produced as good results as earlier experiments with phage sediment and Difco adjuvant. The immunization did not affect gross milk composition. The aim is to produce milk containing antibodies against phages. [See FSTA (1978) **10** 10P1408.] JMD

124

Characteristics of bacteriophages of thermophilic lactic streptococci isolated during the production cycle.
Koroleva, N. S.; Bannikova, L. A.; Mytnik, L. G.; Bespalova, I. A.
XX International Dairy Congress E, 564 (1978) [2 ref. En] [All-Union Res. Inst. of Dairy Ind., Moscow, USSR]

Phages of Str. thermophilus were isolated from commercial starters and fermented milk products. The phage studied (F_t) had a broad spectrum of action and was shown by electron microscopy to consist of 2 types of particle. Phages of thermophilic streptococci did not lyse mesophilic species. [See FSTA (1978) 10 10P1408.] CDP

125

A starter for direct addition to butter granules in the manufacture of lactic butter.
Pearce, L. E.; Halligan, A. C.
XX International Dairy Congress E, 666 (1978) [3 ref. En]

Lactic butters were produced by incorporating 8% starter, consisting of a high-acid blend and flavour-producing blend of selected lactic acid bacteria, into well-drained (12-13% moisture) sweet-cream butter granules, and draining off the excess starter to reduce the butter moisture to ⩽16%. The butter had a clean mellow flavour with a distinct diacetyl aroma, and compared favourably with traditional ripened-cream butter. The elimination of cream-ripening allows normal buttermaking to the granule stage, and gives sweet buttermilk. [See FSTA (1978) 10 10P1408.] FL

126

Choice of starter for the manufacture of soft cheese.
Martley, F. G.
XX International Dairy Congress E, 559-560 (1978) [5 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Camembert cheese was made successfully in small-scale trials with a multiple strain casein starter consisting of 32 strains of Streptococcus cremoris, the pH being reduced to <5.2 within 6 h of inoculating the milk; similar results were obtained with a 6 strain starter. [See FSTA (1978) 10 10P1408.] EJM

127

Origin of lactic streptococcal phages in cheese factories.
Heap, H. A.; Jarvis, A. W.; Lawrence, R. C.
XX International Dairy Congress E, 551-552 (1978) [En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Studies with 10 starter strains, which were introduced into a factory where phage could not be detected, showed that indicator strains for induced temperate phages have proved to be very difficult to find. This is in agreement with the relative ease with which stable rotations could be established in these studies. It has been generally accepted that every strain of lactic streptococcus used as a starter will ultimately be attacked in the factory by phage, but the findings in these studies show that this need not necessarily occur if starters are selected that are not attacked readily by existing phages and are not able to act as indicator strains for any temperate-phages induced from the other starters in use. [See FSTA (1978) 10 10P1408.] FL

128

Antagonism of lactic acid bacteria to moulds growing on the cheese surface.
Magak'yan, J. T.; Chuprina, D. F.
XX International Dairy Congress E, 539 (1978) [En] [Zootech.-Vet. Inst. of Erevan, Erevan, USSR]

Inhibitory effect of lactobacilli (including X-ray mutants) and streptococci on various moulds growing on cheese was determined. The most effective inhibitors were 5 X-ray mutants of Lactobacillus bulgaricus, and 1 strain of Streptococcus lactis and Str. bovis. It is concluded that inhibitory strains of lactic acid bacteria may be usefully incorporated into the starters in the manufacture of ripened cheese and cultured milks. [See FSTA (1978) 10 10P1408.] FL

129

Determination of inhibitory substances in milk.
Semenikhina, V. F.; Khor'kova, E. A.; Danilenko, I. P.
XX International Dairy Congress E, 193-194 (1978) [En] [All-Union Inst. of Dairy Ind., Moscow, USSR]

A microbiological method for the detection of antibiotics and other inhibitory substances in milk uses a sensitive Streptococcus thermophilus strain as the test organism, and resazurin as the indicator. The method is used for the detection of inhibiting agents, such as penicillin (0.01 IU/ml), formalin (0.005%), chloramine (0.1%) and H_2O_2 (0.05%) in raw milk. [See FSTA (1978) 10 10P1408.] FL

130

Factors affecting the production of stable Lactobacillus acidophilus concentrate.
Lagoda, I. V.; Bannikova, L. A.
XX International Dairy Congress E, 579 (1978) [En] [All-Union Res. Inst. of Dairy Ind., Moscow, USSR]

A concentrate of L. acidophilus is produced by cultivation on special whey medium supplemented with maize extract, vitamin B_{12} complex, trypsin, buffering salts and growth-promoting substances; centrifugal separation and concentration at 20 000 rev/min; mixing with a protective medium; and freeze-drying. The concentrate contained 2.5-6.0 × 10^{11} viable L. acidophilus bacteria/g, and retained high activity during storage at 3-5° or 18-25° C for

16 and 4 months, resp. When used at 1 g/600 l. milk it fermented the milk in 4-6 h. [See FSTA (1978) **10** 10P1408.] FL

131

Effect of lysozyme on thermophilic lactic acid bacteria.
Bottazzi, V.; Battistotti, B.; Bosi, F.; Corradini, C.; Acqua, E. dell'
XX International Dairy Congress E, 527-528 (1978) [6 ref. En] [Inst. of Dairy Microbiol., Univ. Cattolica, Piacenza, Italy]

Growth of Lactobacillus helveticus in milk was inhibited by >50 p.p.m. lysozyme, whereas in whey lower levels of the enzyme were inhibitory. In the manufacture of Italian long-ripening cheeses, addition of 5-10 p.p.m. lysozyme after cutting the curd is suggested. [See FSTA (1978) **10** 10P1408.] MEG

132

Comparison of aroma compounds produced by Lactobacillus helveticus and Lactobacillus jugurti.
Kambe, M.; Kimura, M.; Tsuchiya, F.
XX International Dairy Congress E, 285 (1978) [En] [Res. Inst., Meiji Milk Products Co. Ltd., Tokyo, Japan]

Acetaldehyde was the most prominent aroma compound produced by 4 strains of L. helveticus and 4 of L. jugurti in reconstituted skim-milk. The L. jugurti produced more acetaldehyde and a later and more sustained max. concn. than L. helveticus. Mutants induced by N-methyl-N'-nitro-N-nitrosoguanidine produced more ethanol but a similar pattern of acetaldehyde as the mother strains. [See FSTA (1978) **10** 10P1408.] JMD

133

Flavour compounds produced by lactic acid bacteria during cultivation in milk.
Ter-Kazar'yan, S. S.; Saakyan, R. V.; Sarkisyan, V. K.; Ioanisyan, T. A.; Kharatyan, V. G.; Sagoyan, A. S.; Chobanyan, M. K.
XX International Dairy Congress E, 285-286 (1978) [4 ref. En] [Zootech. Vet. Inst., Erevan, USSR]

A study of aroma compounds produced in 24-h skim-milk cultures of 1-37 strains each of Lactobacillus helveticus, L. lactis, L. plantarum, Streptococcus faecalis, Str. faecalis subsp. zymogenes, Str. faecium and Str. bovis showed considerable intraspecies differences in the amounts of the various substances produced. Many strains accumulated quantities several times in excess of the taste threshold. The streptococci and enterococci showed a high capacity for developing aroma compounds. [See FSTA (1978) **10** 10P1408.] CDP

134

Studies of the proteolytic activity of some strains of lactic acid bacteria.
Dilanyan, Z. K.; Grushina, E. V.
XX International Dairy Congress E, 476-477 (1978) [En] [Zootech.-Vet. Inst., Erevan, USSR]

5 lactic acid bacteria used in cheesemaking showed proteolytic activities in hydrolysed milk medium in the order Lactobacillus helveticus > L. casei > L. plantarum > Streptococcus bovis > Str. lactis. Activity of intracellular enzymes in each case was about twice that of the extracellular enzymes. [See FSTA (1978) **10** 10P1408.] CDP

135

Degradation of casein and fractions of casein by gamma-radiation induced mutants of lactobacilli.
Jasjit Singh; Ranganathan, B.
Indian Journal of Experimental Biology 15 (6) 490-492 (1977) [12 ref. En] [Div. of Microbiol., Nat. Dairy Res. Inst., Karnal, Haryana, India]

Whole cow casein and purified α_s-, β- and κ-casein fractions on inoculation with washed cell suspensions of Lactobacillus bulgaricus 59 and L. casei RTS and one γ-radiation induced mutant of each of these cultures were incubated for 10 days at 37° C. Insoluble fractions of the degraded substances in veronal buffer (pH 8.6), when subjected to DEAE cellulose column chromatography, revealed that both the parent and mutant cultures of L. bulgaricus 59 caused greater degradation of the α_s- and κ- than the β-component of whole casein. All 3 components of whole casein were degraded in L. casei RTS and its γ-radiation induced mutant (Lc/G-1); the extent of degradation, however, was faster with the mutant culture. Studies with DEAE cellulose column chromatography of purified fractions of casein treated with the 2 lactobacilli and their γ-radiation induced mutants indicated that the latter hydrolysed all the 3 purified casein fractions much faster than did the parent cultures. CFTRI

136

Biochemical and rheological properties of yoghurt with added Bifidobacterium bifidum.
Kisza, J.; Zbikowski, Z.; Kolenda, H.
XX International Dairy Congress E, 545-546 (1978) [4 ref. En] [Inst. of Food Eng. & Biotech., Acad. of Agric. & Tech., Olsztyn, Poland]

Incorporation of bifidobacteria into yoghurt starter had a beneficial effect on biochemical changes in and rheological properties of the final product, thereby enhancing its dietary value. [See FSTA (1978) **10** 10P1408.] MEG

137

Counting of Streptococcus thermophilus and of Lactobacillus bulgaricus in yoghurt.
Accolas, J.-P.; Veaux, M.; Delmas, C.; Sansoulet, O.; Grappin, R.; Petransxiene, D.
XX International Dairy Congress E, 349 (1978)

[2 ref. En] [Lab. de Tech. Laitiere, INRA, Jouy-en-Josas, France]

Selective agar media were used to determine counts of L. bulgaricus (anaerobic incubation for 3 days at 37° C on MRS agar) and Str. thermophilus (aerobic incubation for 2 days at 37° C on M17 agar) in 198 commercial yoghurts, 89% of samples contained more streptococci than lactobacilli. A min. of 10^8 lactic acid bacteria/g is proposed as the French standard for yoghurt. [See FSTA (1978) 10 10P1408.] MEG

138

The symbiosis between Lactobacillus bulgaricus and Streptococcus thermophilus in yoghurt cultures.

Higashio, K.; Kikuchi, T.; Furuichi, E.

XX International Dairy Congress E, 515-516 (1978) [3 ref. En] [Tech. Res. Inst., Snow Brand Milk Products Co. Ltd., Kawagoe, Saitama, Japan]

Growth factors for Str. thermophilus, produced by L. bulgaricus in milk cultures, were identified as valine, histidine, methionine, glutamic acid and leucine. A mixture of all 5 amino acids was required. Formic and pyruvic acids, produced by Str. thermophilus, stimulated growth of L. bulgaricus. [See FSTA (1978) 10 10P1408.] MEG

139

Phyliosphere lactic acid bacteria isolates for making Cheddar cheese.

Prasad, J.; Edward, J. C.

XX International Dairy Congress E, 546-547 (1978) [2 ref. En] [Allahabad Agric. Inst., Allahabad, Uttar Pradesh, India]

Small Cheddar cheeses were made with 4 different starters, using anaerobic ripening conditions. Scores for flavour, texture and consumer acceptance were higher and ripening was faster for cheese made with a Lactobacillus sp. or with this species plus a Streptococcus sp. than with the Streptococcus sp. alone or with a commercial starter. The Lactobacillus and Streptococcus were isolated by the authors from the phyllosphere of plants. [See FSTA (1978) 10 10P1408.] JMD

140

Use of freeze-dried concentrated suspensions of mesophilic lactic acid bacteria for the making of soft cheeses.

Vassal, L.; Bouillanne, C.; Auclair, J.

XX International Dairy Congress E, 585-586 (1978) [1 ref. En] [Exp. Dairy & Lab. of Dairy Tech., INRA, Jouy-en-Josas, France]

A concentrated suspension of 4 lactic streptococci was freeze-dried and added, at 0.05%, to pasteurized milk. The milk was ripened for 16-17 h at 22° or 26° C and mixed with 9 parts of cold pasteurized milk. Camembert cheeses made from this milk or from milk ripened with a starter culture of the same composition did not differ in acidity development, composition or organoleptic properties. [See FSTA (1978) 10 10P1408.] JMD

141

Influence of bacterial starter from X-ray mutants on the quality of Swiss cheese.

Dilanyan, Z. K.; Kocharyan, N. A.

XX International Dairy Congress E, 548-549 (1978) [4 ref. En] [Erevan Zoovet. Inst., Erevan, USSR]

X-ray mutants of Lactobacillus helveticus and L. plantarum, selected for their ability to accumulate free amino acids and fatty acids in ratios characteristic of high-grade cheeses, retained their acquired properties for several yr. Use of these mutants resulted in a 15-25% reduction in ripening period, and improved product quality. [See FSTA (1978) 10 10P1408.] CDP

142

[Lactic acid bacteria inhibiting growth of Clostridium tyrobutyricum in cultures and in cheese.]

Bergere, J. L.; Sys, T.; Vassal, L.

Lait 58 (575/576) 215-233 (1978) [37 ref. Fr, en] [Lab. de Biochimie Microbienne et Laiterie Exp., INRA, 78350 Jouy-en-Josas, France]

252 strains of lactic acid bacteria were examined (by the agar diffusion technique) for their ability to inhibit growth of 7 strains of C. tyrobutyricum. Only 6 strains (Lactobacillus plantarum 3 and CNRZ 343, L. casei K6 and CNRZ 316, L. helveticus 45 and Streptococcus deacetilactis CNRZ 190) showed inhibitory activity. This activity was not due to lactic acid or H_2O_2, and was shown to be associated with the viable cells rather than the culture medium or cell extracts. In preliminary trials with Emmental cheeses, manufactured from milk containing added C. tyrobutyricum spores, spoilage due to butyric acid blowing was reduced from 90 to 43% by addition of 5 of the inhibitory strains (but not Str. diacetilactis) before renneting. MEG

143

[Raw sausage production with the aid of starter cultures.] Rohwurstherstellung mittels Starterkulturen.

Schiefer, G.; Schöne, R.

Nahrung 22 (4) 419-424 (1978) [36 ref. De, en, ru] [Veterinärhygiene-Inspektion des Bezirkes Leipzig, German Democratic Republic]

The use of a starter culture from Pediococcus cerevisiae Pc 30 was tested under commercial conditions for the manufacture of raw sausage (Braunschweigischer Mettwurst, garlic sausage, cerevelat). Tests covered moisture, fat, protein and salt contents, and appearance, taste and odour. The starter culture had a beneficial effect on overall sausage quality; e.g. colour formation and retention were improved and the cerevelat was ready for cutting after 4-5 days (compared with 16-20 days without the starter culture). No faulty batches were observed over a longish production period. IN

144

Union of Swiss Societies of Experimental Biology. Abstracts of the 10th annual meeting. [Conference proceedings]
Switzerland, Union of Swiss Societies of Experimental Biology
Experientia 34 (7) 894-962 (1978) [En]

Abstracts are published of papers presented at the meeting, held at Davos, 19-20 May 1978. The abstr. include M-line in chicken muscle, by C. W. Heizmann, I. E. Hotz & H. M. Eppenberger (p. 911); Low molecular weight calcium-binding proteins from chicken muscle, by E. E. Strehler, H. M. Eppenberger & C. W. Heizmann (p. 919); The metabolism of (^{14}C)-aflatoxin B_1 in pigs [including a study of distribution of ^{14}C in edible tissues], by J. Lüthy, U. Zweifel & C. Schlatter (p. 926); Proteolytic enzymes in wheat ears during maturation, by U. Feller (p. 940); and Proteolytic activity, lactic acid production, N-acetyl-D-glucosamine fermentation and plasmids in Lactobacillus helveticus subsp. jugurti, by M. Smiley, R. Maret & V. Fryder (p. 955). DIH

145

Influence of variable gas atmosphere on growth of Pediococcus and Propionibacterium.
Brinchmann, E.; Langsrud, T.; Sorhaug, T.
XX International Dairy Congress E, 354 (1978) [2 ref. En] [Dairy Res. Inst., Agric. Univ. of Norway, As-NLH, Norway]

Using the Hungate roll-tube technique, it was shown that pediococci grew best (at 25° C) in air, but better in CO_2 alone than in CO_2 + 0.8-16% O_2. Propionibacteria (at 30° C) grew only in tubes containing pure CO_2. [See FSTA (1978) **10** 10P1408.] CDP

146

Effect of lactose concentration on the efficiency of plating of bacteriophages on Streptococcus cremoris.
Terzaghi, E. A.; Terzaghi, B. E.
Applied and Environmental Microbiology 35 (3) 471-478 (1978) [27 ref. En] [Dep. of Microbiol. & Genetics, Massey, Univ., Palmerston North, New Zealand]

The efficiency of plating of phages derived by UV induction of, or by lytic growth on, certain strains of Str. cremoris was found to vary by as much as 10^5 depending on the lactose concn. of the medium in which the indicator bacteria were grown and the length of time the stationary-phase indicator cultures was aged. This effect was noted only when the culture was used as an indicator for phages that had previously grown on an apparently unrelated strain of bacteria. These observations suggest the presence of some kind of physiologically labile restriction system in strains of Str. cremoris. The implications of this finding for increasing the sensitivity of the host range test in determining phage susceptibility, whether from induced lysates, whey, or lytic phage stocks, are discussed. It is recommended that, for all such testing, the concn. of lactose in buffered media be increased to such levels as required to obtain a final pH similar to that of a freshly coagulated milk culture, namely, below pH 5.0. AS

147

Method of producing soybean milk yoghurt.
Kanda, H.; Wang, H. L.; Hesseltine, C. W.
(United States of America, Secretary of Agriculture)
United States Patent 4 066 792 (1978) [En]

Milk extracted from soybeans is mixed with whey solids (preferably 2%), sucrose (4-5%) and sterilized at 90-121° C. The hot milk is mixed with a dilute aqueous gelatin solution (up to 1.5%) and, after being rapidly cooled to 30-35° C, inoculated with an equal mixture of 2 strains of Lactobacillus acidophilus (NRRL B-1910 and NRRL B-2092). The mixture is subsequently incubated at 35-40° C for 16-24 h to produce an imitation yoghurt. EJM

148

Utilization of oleuropein by microorganisms associated with olive fermentation.
Garrido-Fernandez, A.; Vaughn, R. H.
Canadian Journal of Microbiology 24 (6) 680-684 (1978) [28 ref. En, fr] [Dep. of Food Sci. & Tech., Univ. of California, Davis, California, 95616, USA]

The utilization of oleuropein, the bitter glucoside of olives whose hydrolysis products can possess antibacterial action, as a major source of carbon by microorganisms was assessed. Various microorganisms associated with fermentation of olives (both desirable lactic acid bacteria and spoilage organisms) were able to grow on the media. Bacto yeast nitrogen medium with or without 1% glucose, containing 0.2 or 0.4% oleuropein, and many without a significant delay in growth resulting in the appearance of a strong visible turbidity. Although the increase in oleuropein from 0.2 to 0.4% (w/v) had little or no effect on the spoilage organisms, the additional glucoside caused a delay in development of growth with some lactic acid bacteria. It was concluded that the glucoside was not inhibitory to spoilage organisms, but that perhaps the glucose moiety of the glucoside is the limiting factor for development of strong turbidity in some cultures. It was also thought that the degradation of the compound contributes to the accumulation of acids and flavouring compounds of fermented green olives, as well as the typical residual bitterness associated with such olives. SP

149

[Effect of lysozyme on growth of Bifidobacterium bifidum in cows' milk.]
Kisza, J.; Panfil-Kuncewicz, H.
Zeszyty Naukowe Akademii Rolniczo-Technicznej w Olsztynie No. 173 (Technologia Zywnosci 11), 51-63 (1977) [14 ref. Pl, ru, en] [Inst. Inzynierii i Biotech. Zywnosci, ART, Olsztyn, Poland]

4 strains of B. bifidum were used. Bulk skim-milk from a herd free from tuberculosis and contagious abortion was sterilized and divided into 4 portions; lysozyme was added to 2 portions at 100 mg/l. 1 of these portions and a control portion without added lysozyme were incubated for 2 h at 37° C and then heated to 80° C for 15 min (modified milk) to inactivate lysozyme. All 4 portions were inoculated with 5% of a B. bifidum culture and incubated at 37° C for 4, 8 and 24 h. Growth of the B. bifidum strains was also measured in milks to which N-acetylglucosamine had been added at 0.7 g/l., in human milk modified as above, in cows' milk containing 10, 25, 50 or 100% modified milk, and in dried skim-milks made from 25 or 100% modified milk or from milk concentrated and then supplemented with lysozyme. The main conclusions from results (tabulated in detail) were that modified milk, whether subsequently dried or not, stimulated growth of B. bifidum and that addition of N-acetylglucosamine had a similar effect, but that direct addition of lysozyme to milk, whether subsequently dried or not, had no stimulatory effect. SKK

150

Selection of the most suitable nutrient medium for making bacterial concentrates for sour milk.
Kondratenko, M. S.; Kondareva, S. Z.
XX International Dairy Congress E, 576-577 (1978) [En] [CEPO, DSO 'Mlechna Promishlenost', Sofia, Bulgaria]

29 nutrient media, based on skim-milk, hydrolysed milk, whey, extracts of maize, soya beans, oats and bran with added lactose and sodium acetate were tested in a study carried out to develop new bacterial concentrates for yoghurt manufacture. Best results were obtained with a medium consisting of 500 ml skim-milk, 500 ml water, 3% yeast extract and 2% sodium acetate which gave high yields of cells of both Lactobacillus bulgaricus and Streptococcus thermophilus. [See FSTA (1978) **10** 10P1408.] FL

151

Mathematical simulation and optimization of continuous cultivation of lactic streptococci during production of bacterial concentrates.
Vainberg, I. A.; Koroleva, N. S.; Brusilovskii, L. P.
XX International Dairy Congress E, 575-576 (1978) [En] [All-Union Res. Inst. of the Dairy Ind., Moscow, USSR]

A mathematical model for continuous cultivation under optimum growth conditions consists of a system of equations involving both a growth kinetics equation and 3 equations for material balance for microorganisms, lactose concn. and neutralizer. The analytical table technique was used to calculate optimum parameters of the process. [See FSTA (1978) **10** 10P1408.] CDP

152

Effect of bacteriophages on the growth of streptococci.
Blaim, H.; Busse, M.
XX International Dairy Congress E, 458-459 (1978) [2 ref. En] [Süddeutsche Versuchs- & Forschungsanstalt für Milchwirtschaft, Weihenstephan, Freising, Federal Republic of Germany]

Incubation of Streptococcus faecalis or Str. cremoris at 10^6/ml with about 140 plaque-forming-units of homologous phage/ml reduced the streptococci to minima of 10^4 and 10^3/ml, resp. Growth of streptococci was resumed after about 10 h, indicating the development of phage-resistant mutants. [See FSTA (1978) **10** 10P1408.] JMD

153

Freeze-drying of starters for yoghurt and of Lactobacillus bulgaricus in protective media.
Nikolova, N.
XX International Dairy Congress E, 584-585 (1978) [En] [TsEPL DSO 'Mlechna Promishlenost', Sofia, Bulgaria]

10% sugar solution gave the best protection of yoghurt starter during freeze-drying (100% Streptococcus thermophilus and 90% Lactobacillus bulgaricus survived) whilst a medium containing peptone afforded the best protection during subsequent storage at 4° C. 5 or 10% peptone or polymer 1500 afforded the best protection during freeze-drying of L. bulgaricus 144. [See FSTA (1978) **10** 10P1408.] CDP

154

Bacterial concentrate for ripened-cream butter and cultured cream manufacture.
Chuzhova, Z. P.; Belova, G. A.
XX International Dairy Congress E, 591-592 (1978) [En] [All-Union Res. Inst. for Butter & Cheese Ind., Uglich, USSR]

A freeze-dried concentrate of Streptococcus lactis, Str. cremoris and Str. diacetilactis is prepared by culturing the bacteria in reconstituted milk with suitable additives, centrifugal separation of the biomass, incorporation of a protective medium and freeze-drying. The concentrate contains 200 000-300 000 million cells/g and can be stored at $\leqslant 10°$ C for about 3 months. It was used successfully in the manufacture of ripened cream butter and cultured cream. [See FSTA (1978) **10** 10P1408.] FL

155

The possible use of lac⁻ starter strains to accelerate cheese ripening and a method for their detection in cheese.
Dulley, J. R.; Brooks, D. E. J.; Grieve, P. A.
XX International Dairy Congress E, 485-486 (1978) [4 ref. En] [Otto Madsen Dairy Res. Lab., Hamilton, Australia]

Cultures of lac⁻ mutants of Streptococcus lactis strain C2 were added to the cheese vat with Str. cremoris strain E8 as starter. Increase in lac⁻ C2 count was much slower during cheesemaking than the increase in E8 count. Addition of the lac⁻ mutant resulted in some accelerated ripening and less bitterness development than in control cheeses. [See FSTA (1978) 10 10P1408.] DMK

156

Study of the effect of technology on the survival of undesirable microflora in Slovak ewes' milk cheese.
Prekoppova, J.
XX International Dairy Congress E, 767-768 (1978) [En] [Res. Cent. of Dairy Ind., Zilina, Czechoslovakia]

Salmonella typhimurium and Shigella sonnei were inoculated into raw milk which was then made by a conventional process into Hrudka cheese. The fermentation and ripening of the cheese was normal. The counts of both organisms in the cheese decreased rapidly during the first 24 h after manufacture and were not detected by 3rd-10th day. The inhibitory effect on the pathogens is attributed to lactic acid bacteria and the products of their metabolism. [See FSTA (1978) 10 10P1408.] FL

157

Changes in the proteolytic activity of enzyme systems of lactic acid bacteria in cheese.
Shalygina, A. M.; Surovtseva, V. V.
XX International Dairy Congress E, 493-495 (1978) [En] [Ukrainian Sci. Res. Inst. of Meat & Milk Ind., Kiev, USSR]

The numbers and protease activity of lactic acid bacteria increased 3-fold when Dutch-type cheese was scalded at 34° rather than 39° C. After scalding at 34° C, soluble protein fractions, flavour and consistency of 30-day-old cheese were similar to those of normal cheeses ripened for 75-90 days. [See FSTA (1978) 10 10P1408.] ADL

158

Biochemical study of Streptococcus lactis.
Pech, Z.; Krabova, H.
XX International Dairy Congress E, 507-508 (1978) [En] [Dairy Res. Inst., Prague, Czechoslovakia]

90 strains of Str. lactis obtained from culture collections were studied for biochemical properties and whey liberation, and resistance to penicillin, phenol, NaCl and heating. The max. acidifying activity occurred with all strains when the milk began to coagulate. In the manufacture of high-temp. scalded cheeses the numbers of Str. lactis were reduced by about half, but were not affected by low-temp. scalding. The strains which were found to be most suitable for cheese manufacture and production of fermented products are listed. [See FSTA (1978) 10 10P1408.] FL

159

Selection of Streptococcus diacetilactis strains with stable aroma-producing properties.
Keterska, B.; Hoppe, K.; Zaworowski, K.; Ostapowicz, A.
XX International Dairy Congress E, 523-524 (1978) [3 ref. En] [Inst. of Dairy Ind., Olsztyn, Poland]

Characteristics (diacetyl and acetoin production and homogeneity) of 8 strains and 6 sub-strains of Str. diacetilactis were examined. Stability of a strain should be assessed from its diacetyl production rather than acetoin + diacetyl production. [See FSTA (1978) 10 10P1408.] MEG

160

Bacteriophages of various strains of lactic acid bacteria used in different starters.
Sozzi, T.; Poulin, J. M.; Maret, R.; Bohren, H.
XX International Dairy Congress E, 561-562 (1978) [En] [Beratungsgesellschaft für Nestle-Produkte AG, Switzerland]

Two phages have been isolated and characterized. They lyse resp. a Leuconostoc and a topy Streptococcus lactis, despite the polysaccharides formed by these 2 species. It is considered that all starter organisms are susceptible to phage attack. [See FSTA (1978) 10 10P1408.] JMD

161

Differential medium for Streptococcus thermophilus in dairy products.
Ottogalli, G.; Galli, A.
XX International Dairy Congress E, 350 (1978) [3 ref. En] [Istituto di Microbiol. Agraria, Univ. di Milano, Milan, Italy]

Str. thermophilus could be distinguished from other thermophilic streptococci by anaerobic incubation at 45° C on a whey agar medium containing 0.3% tyrosine and 0.1% tetrazolium salts. Str. faecalis, Str. faecium and Str. durans gave clearance halos around the colonies, Str. bovis gave pink colonies, whilst Str. thermophilus gave red colonies with no clearance halo. [See FSTA (1978) 10 10P1408.] JMD

162

Reduction of lactic acid, nonprotein nitrogen, and ash in lactic acid whey by Candida ingens culture.
Ruiz, L. P., Jr.; Gurnsey, J. C.; Short, J. L.
Applied and Environmental Microbiology 35 (4) 771-776 (1978) [30 ref. En] [Dep. of Sci. & Ind. Res., New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

A simple, efficient procedure for removing lactic acid and for reducing non-protein N and ash in lactic acid whey consists of culturing C. ingens on the whey. This organism assimilated >98% of the lactic acid and approx. 40% of the non-protein N. Ash reduction of up to 45% resulted from precipitation of calcium apatite due to the increase

in pH from 4.4 to approx. 8.0 which occurred during growth of C. ingens. Improved fluxes during laboratory-scale ultrafiltration were obtained for the treated lactic acid whey. C. ingens treatment of lactic acid whey appears to facilitate processing of this material to a more useful product. AS

163

[Quantitative aspects of normal bacterial flora in yoghurt. Counting, development during storage and identification.]
Walter, J.; Hasselmann, M.; Castillo, M.
Revue Laitiere Francaise No. 362, 117, 119, 121-129 (1978) [9 ref. Fr] [Lab. d'Analyses et de Recherches Bromatologiques et Nutr., Univ. Louis Pasteur, Strasbourg, France]

Chalmers or MRS media, with 8% NaCl/1% tryptone diluent, were selected for enumeration of Lactobacillus bulgaricus and Streptococcus thermophilus in yoghurt. When tested 1-2 days after manufacture and again at the limit date of sale, decrease in bacterial count during storage at 4° C was greatest in samples with the highest acidity at the beginning of storage. It is recommended that yoghurt be considered unacceptable if the count of either organism falls to < 1 million/g by the limit date of sale. Amount of acid produced during storage was a function of the particular strains present and not related to numbers of either organism. Tests recommended for identification of Str. thermophilus are its ability to grow at 45° C but not 10° C, and absence of catalase when grown in 40% bile medium or 6.5% NaCl; the API system may also be used for identification of both organisms from their biochemical characteristics. CDP

164

Modification of the New Zealand starter culture concept in the manufacture of Cheddar cheese in the United States. [Abstract]
Moskowitz, G. J.; Staehler, G.; LaBelle, G.
Journal of Dairy Science **61** (Suppl. 1) 116 (1978) [En] [Dairyland Food Lab., Waukesha, Wisconsin, USA]

Phage unrelated single strains were selected to form 8 different triplets of one slow and one fast Streptococcus cremoris and one Str. lactis. When used at a small US cheese plant without any special air-flow control, all cheese produced was Wisconsin State Brand grade. Acid development was good throughout 3 rotations. CDP

165

Activity of freeze dried lactic starter concentrates in bulk starter and simulated Cheddar cheese manufacture. [Abstract]
Yang, N. L.; Sandine, W. E.
Journal of Dairy Science **61** (Suppl. 1) 121 (1978) [En] [Oregon State Univ., Corvallis, Oregon 97331, USA]

Survival rate and acid-producing activity of Streptococcus lactis H_1 were much higher when 15% β-glycerolphosphate was included in the 11% skim-milk suspension medium in which the cells were freeze-dried. Str. cremoris strains were less active than Str. lactis H_1. Commercial frozen mixed-strain lactic starter concentrates designed for direct set of cheese yielded active freeze-dried concentrates. CDP

166

Acceleration of cheese ripening by the addition of whole cells or cell free extract of Lactobacillus casei to the cheese curd. [Abstract]
El-Soda, M. A.; Abou-Donia, S.; Kamal, N.
Journal of Dairy Science **61** (Suppl. 1) 101 (1978) [En] [Fac. of Agric., Alexandria Univ., Egypt]

Cell-free extract (CFE) of L. casei CNRZ 62 increased the ripening rate when added after milling to Cheddar cheese curd made with Streptococcus lactis starter; whole cells of L. lactis had little effect on ripening. Volatile fatty acids in the ripened cheese were propionic, butyric, acetic and (in cheese made with CFE only) caproic and caprylic acids. CDP

167

Acceleration of cheese ripening by the addition of the curd cell free extract of some lactobacilli to the cheese curd. [Abstract]
El-Soda, M. A.; Abou-Donia, S.; Badran, A.
Journal of Dairy Science **61** (Suppl. 1) 102 (1978) [En] [Fac. of Agric., Alexandria Univ., Egypt]

Ripening rate of Cheddar cheese made with D-glucono-δ-lactone was increased by addition of crude cell-free extracts of lactobacilli after milling. Cheese made with Lactobacillus lactis had the highest soluble protein content at the end of ripening, and that made with L. bulgaricus extract had the highest total volatile acidity. Acetic and butyric were the only volatile fatty acids detected using TLC. CDP

168

[Development of thermophilic lactic acid bacteria of hard cheese during pressing.]
Accolas, J. P.; Veaux, M.; Vassal, L.; Mocquot, G.
Lait **58** (573/574) 118-132 (1978) [18 ref. Fr, en] [Lab. de Tech. Laitiere, INRA, 88350 Jouy-en-Josas, France]

During whey drainage of hard cheeses (Gruyere & Emmental), Streptococcus thermophilus grows fairly rapidly and reaches its max. in < 6 h of pressing, whereas Lactobacillus helveticus grows much more slowly and reaches its max. between 15 and 20 h of pressing. Noticeable differences were observed (higher than a decimal log) between the bacterial populations developed in the centre and at the edge of the same cheese. The implications of this phenomenon in the formation of a lactate gradient within the cheese, during whey drainage, are discussed. AS

169

[Principles of the effect of lysozyme in the manufacture of semi-hard cheese. II. Influence of lysozyme on starter cultures and coliforms.]
Grundlagen der Lysozymwirkung bei der Herstellung von Schnittkäse. II. Einfluss des Lysozyms auf Reifungserreger und coliforme Keime.
Wasserfall, F.
Milchwissenschaft **33** (2) 91-96 (1978) [8 ref. De, en] [Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

In numerous experiments, effects of addition of lysozyme at 0-1000 units/ml medium as the Fa. Roth preparation, or fresh egg white or, occasionally, Merck dried egg albumin [see part I, FSTA (1978) **10** 6P845] on different microorganisms were studied. Strains of Streptococcus lactis, Str. cremoris, Str. diacetilactis and Escherichia coli as well as a butter starter were used as resting cells, cells proliferating in semi-synthetic media or developing in cheese curd after addition to cheese milk. The main conclusions from results tabulated in detail were that resting cells were inactivated by prolonged contact with the phosphate buffer alone and that lysozyme enhanced this effect; that lysozyme inhibited proliferating streptococci, but not proliferating E. coli; that in curd, streptococci were inhibited to differing extents, Str. diacetilactis being on the whole least resistant, and Str. lactis being most resistant; and that the butter starter was restricted in its acid-forming capacity. E. coli was not inhibited in curd, so that heat treatment remained essential for its destruction. SKK

170

Influence of various thermophilic lactic cultures on proteolysis of Swiss Emmental cheese.
Lavanchy, P.; Bühlmann, C.; Blanc, B.
XX International Dairy Congress E, 484-485 (1978) [1 ref. En] [Fed. Dairy Res. Sta., Liebefeld-Berne, Switzerland]

Emmental cheese was made with 1 of 3 starter cultures from cheese factories. The 3rd culture, which was associated with secondary fermentation in the cheese, had the highest leucine aminopeptidase activity, produced the most NH_3 and CO_2, and gave the highest content of free amino acids in cheese, particularly aspartic and glutamic acids and tyrosine. Determination of free amino acids could detect secondary proteolytic fermentation in cheese. [See FSTA (1978) **10** 10P1408.] JMD

171

Proteolytic activity of nisin-producing lactic acid streptococci.
Oberman, H.; Gajewska, B.
XX International Dairy Congress E, 461-463 (1978) [En] [Inst. of Fermentation Tech. & Microbiol., Tech. Univ., Lodz, Poland]

21 strains of Streptococcus lactis with different nisin-producing activities were examined for intra- and extra-cellular proteolytic activities. No correlation between nisin production and proteolytic activity was found. [See FSTA (1978) **10** 10P1408.] MEG

172

Isolation of bacteriophage-resistant mutants of Streptococcus lactis.
Hull, R. R.
XX International Dairy Congress E, 566 (1978) [2 ref. En] [Dairy Res. Lab., CSIRO, Div. of Food Res., Highett, Victoria, Australia]

17 bacteriophages capable of attacking Str. lactis DR4 could be arranged in 4 groups on the basis of both morphology and cross-resistance of bacteriophage-resistant mutants isolated from Str. lactis DR4. Mutants resistant to all 17 bacteriophages retained the cheesemaking characteristics of the parent strain. [See FSTA (1978) **10** 10P1408.] CDP

173

[Simple and rapid method for detection and demonstration of bacteriophage in Streptococcus thermophilus cultures.]
Caric, M.; Gavaric, D.; Maric, S.; Zec, J.
Mljekarstvo **27** (12) 266-277 (1977) [12 ref. Sh, en] [Tehnoloski Fak., Novi Sad, Yugoslavia]

Fermentation difficulties during Feb.-June 1977 in a commercial yoghurt production line using a 1:1 Streptococcus thermophilus/Lactobacillus bulgaricus starter were investigated. It was established that neither the manufacturing milk nor the line up to the point of starter addition were implicated. Presence of bacteriophage in the factory starter was demonstrated in laboratory tests. SKK

174

Variations in the folic acid content of milk during fermentation by streptococci and lactobacilli.
Drewek, Z.; Roczniak, B.
XX International Dairy Congress E, 756-757 (1978) [3 ref. En] [Inst. of Food Eng. & Biotech., Univ. of Agric. & Tech., Olsztyn, Poland]

Increases in folic acid content of milk were greater during fermentation with mixed streptococcal than with single strains of Str. diacetilactis or Str. cremoris. The peak level was after 12-18 h. Str. thermophilus and Lactobacillus bulgaricus synthesized folic acid as mixed cultures, but not as monocultures. Bifidobacterium bifidum and L. acidophilus reduced the folic acid content. [See FSTA (1978) **10** 10P1408.] ADL

175

Preparation and characteristics of deep-frozen concentrates of aroma-producing lactic acid streptococci.
Piatkiewicz, A.; Libudzisz, Z.; Oberman, H.
XX International Dairy Congress E, 582 (1978)

[En] [Inst. of Fermentation Tech. & Microbiol., Tech. Univ., Lodz, Poland]

Frozen concentrates of 16 strains of Streptococcus diacetilactis (used in butter starters) retained their viability, proteolytic activity and ability to produce diacetyl and acetoin during 3 months storage at -18° C. Acidification of milk by the reactivated frozen cultures was initially slow, but was similar to that of control non-frozen cultures after 12-24 h. [See FSTA (1978) **10** 10P1408.] MEG

176

Optimization of biomass production from Streptococcus lactis and Lactobacillus casei.
Oberman, H.; Piatkiewicz, A.; Libudzisz, Z.
XX International Dairy Congress E, 577-578 (1978) [En] [Inst. of Fermentation Tech. & Microbiol., Tech. Univ., Lodz, Poland]

Cell yield and proteolytic activity was highest when Str. lactis 147 was grown in a whey medium neutralized with NH_4OH rather than NaOH. With L. casei W-10, cell yield was similar in whey and lactose-peptone media neutralized with either NH_4OH or NaOH, but proteolytic activity was higher in cells grown in whey medium with or without NH_4OH neutralization. [See FSTA (1978) **10** 10P1408.] MEG

177

Comparison of the activity and stability of peptide hydrolases in viable cells and in crude cell-free extracts of Lactobacillus casei populations.
Jamroz, T.
XX International Dairy Congress E, 473-474 (1978) [3 ref. En] [Inst. of Fermentation Tech. & Microbiol., Tech. Univ., Lodz, Poland]

The stability of the peptidases in crude cell-free extracts of L. casei and its mutant strains makes it possible to use these enzyme preparations in cheesemaking processes. [See FSTA (1978) **10** 10P1408.] MEG

178

[Proteolytic activity of rennet and Streptococcus lactis on casein.]
Kim, Y. K.; Kirchmeier, O.
Korean Journal of Animal Science **19** (6) 420-423 (1977) [11 ref. Ko, en] [Coll. of Agric., Korea Univ., S. Korea]

Whole acid casein, α-casein and β-casein were each treated with Streptococcus lactis, rennet or a combination of both, and the degradation of caseins was monitored by gel electrophoresis and Sephadex gel filtration. Proteolytic activity increased when Str. lactis and rennet were used together. α-Casein was degraded to a greater extent than β-casein in all treatments. [From En summ.] PAA

179

The content of lactic acid and acetaldehyde in yoghurt stored at different temperatures.
Abrahamsen, R. K.
XX International Dairy Congress E, 829-830 (1978) [3 ref. En] [Dairy Res. Inst., Agric. Univ. of Norway, As-NLH, Norway]

Yoghurt made from 5 different commercial starters was stored at 3°, 10° or 15° C; acidity development continued during storage, even at 3° C. The proportion of L(+)-lactic acid in the total lactic acid decreased during storage, presumably due to the stronger development of Lactobacillus bulgaricus than of Streptococcus thermophilus. There were differences between the 5 starters in the rate of development of acidity and of acetaldehyde. [See FSTA (1978) **10** 10P1408.] JMD

180

Microbiological and enzymic control of yoghurt.
Lusiani, G.; Bianchi-Salvadori, B.
XX International Dairy Congress E, 351 (1978) [4 ref. En] [Yomo SpA, Pasturago di Vernate, Milan, Italy]

Yoghurt stored at 4-5° C kept $> 2.5 \times 10^8$ lactic acid bacteria/ml and alkaline and acid phosphatases and β-galactosidase activities for up to 30 days. The enzymes did not last for 21 days in yoghurt stored at 20° C. In yoghurt heat treated to increase its shelf-life, the lactic acid bacteria were $\leqslant 2 \times 10^6$/ml and the enzymes were virtually inactive. [See FSTA (1978) **10** 10P1408.] JMD

181

Advantages of using Propionibacterium cultures in the production of non-ripening Cottage cheeses.
Roczniak, B.; Krasinska, U.; Bielecka, M.; Drewek, Z.
XX International Dairy Congress E, 598-599 (1978) [4 ref. En] [Inst. of Food Eng. & Biotech., Univ. of Agric. & Tech., Olsztyn, Poland]

Tvarog was prepared using Streptococcus (S) and Propionibacterium (P) starters in specific ratios: best results as regards vitamin B_{12} content and the quality of the product were obtained with 1% S and 2-3% P. Besides an increased vitamin B_{12} content (0.8 μg/100 g vs. 0.03 μg in controls), the experimental cheeses had better shelf life and taste characteristics. [See FSTA (1978) **10** 10P1408.] MC

182

Production of active biomass of Lactobacillus casei for cheesemaking.
Jakubowska, J.; Libudzisz, Z.; Piatkiewicz, A.
XX International Dairy Congress E, 578-579 (1978) [5 ref. En] [Inst. of Fermentation Tech. & Microbiol., Tech. Univ., Lodz, Poland]

The aim was to produce a frozen, concentrated cheese starter. 5 strains of L. casei were compared for rate of growth, biomass yield, acidification and exocellular proteolytic activity in milk before freezing and after 3 months storage at -30° C. The best of 9 culture media was 1.5% lactose, 0.5% yeast extract or 30% yeast water, + enzymic hydrolysate of casein (1%). Sodium citrate should not exceed

0.5%. The frozen starters behaved normally during Edam cheese manufacture. [See FSTA (1978) 10 10P1408.] MC

183

Autolytic properties of some starter streptococci.
Langsrud, T.; Castberg, H. B.; Landaas, A.
XX International Dairy Congress E, 519-520 (1978) [6 ref. En] [Dairy Res. Inst., Agric. Univ. of Norway, As-NLH, Norway]

45 strains of Streptococcus lactis, Str. cremoris, Str. diacetilactis, Str. thermophilus, Str. faecalis and Str. faecium were grown in M17 broth at 30° C for 14 days. Autolysis was determined from changes in optical density at 660 nm. Cell-contained DNA, and released lactate dehydrogenase or proline iminopeptidase activities were all found to be useful markers of autolysis for cheese ripening experiments. [See FSTA (1978) 10 10P1408.] JMD

184

Influence of the ratio of acid-producing to aroma-forming bacteria on the diacetyl content of starters.
Fesnak, D.; Roczniak, B.; Bauman, B.; Kornacki, K.
XX International Dairy Congress E, 524 (1978) [1 ref. En] [Production Lab. of Dairy Biopreparations, Olsztyn, Poland]

4 mixed starter cultures, containing 10, 15, 20 and 25% Streptococcus diacetilactis resp., were grown in reconstituted milk for 14 consecutive days at 23° C. Diacetyl and acetoin production decreased with increasing Str. diacetilactis content. A ratio of 9:1 for acid-producing/aroma-forming bacteria in butter starters is recommended for max. diacetyl formation. [See FSTA (1978) 10 10P1408.] MEG

185

Influence of addition of Leuconostoc strains to mixed cultures on the content of volatile components.
Fesnak, D.; Stepaniak, L.; Bauman, B.
XX International Dairy Congress E, 522 (1978) [En] [Production Lab. of Dairy Biopreparations, Olsztyn, Poland]

Addition of Leuconostoc spp. to mixed mesophilic lactic streptococcal starters significantly reduced acetaldehyde production (from 5.6-6.7 to 1.7-3.3 mg/l.), stabilized diacetyl production (1.0-2.3 mg/l.), significantly increased the ethanol content to 8.5-27.5 mg/l. (vs. 4.5-16.7 mg/l. in controls), but had no effect on the acetone content of cultures (0.9-1.7 mg/l.). [See FSTA (1978) 10 10P1408.] MEG

186

Manufacture of Cheddar cheese with Streptococcus cremoris strains selected for insensitivity to bacteriophages in the factory environment. [Abstract]
Danniell, S. D.; Sandine, W. E.
Journal of Dairy Science 61 (Suppl. 1) 100 (1978) [En] [Oregon State Univ., Corvallis, Oregon 97331, USA]

Starter cultures consisting of 6 of 14 phage-insensitive strains of Str. cremoris, formulated on the basis of generation times and sensitivity in skim-milk, were used in the manufacture of cheeses in 360-l. vats. No phages to any of the 6 strains were detected in the whey when the same starter was used on 3 successive days. CDP

187

Proteolytic activity of Lactobacillus casei mutants: hydrolysis of milk proteins and digestion of α_s-, β-, γ- and κ-casein fractions.
Oberman, H.; Jamroz, T.
XX International Dairy Congress E, 474-475 (1978) [En] [Inst. of Fermentation Tech. and Microbiol., Tech. Univ., Lodz, Poland]

Proteolytic activities of 15 strains of 2 mutants of L. casei and the mother culture were examined. All strains retained active peptide hydrolases for milk proteins and casein fractions after 2 yr of laboratory culture. The stability of the proteolytic activity makes it possible to select suitable strains for use in mixed starters. [See FSTA (1978) 10 10P1408.] MEG

188

Effect of hypochlorite and hydrogen peroxide on bacteriophages.
Nielsen, E. W.
XX International Dairy Congress E, 607-609 (1978) [4 ref. En] [Dep. of Dairy Chem. & Dairy Bact., Royal Vet. & Agric. Univ., Copenhagen, Denmark]

Escherichia coli phage T4 and Streptococcus phage fd 13 were completely inactivated within 5 min by hypochlorite solution containing ⩾ 50 p.p.m. active Cl, whereas H_2O_2 at concn. up to 1000 p.p.m. had little or no effect on either phage. [See FSTA (1978) 10 10P1408.] CDP

189

Activity of Lactobacillus bulgaricus and one of its mutants in different types of milk.
Jasjit Singh; Ranganathan, B.; Chander, H.
XX International Dairy Congress E, 517 (1978) [1 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

A strain of Lactobacillus bulgaricus (59) and its gamma radiation-induced mutant produced higher titratable and volatile acidities, and liberated more tyrosine after incubation in buffaloes' skim-milk than in either cows' or goats' skim-milk. No diacetyl or acetoin was produced in any of the milks. [See FSTA (1978) 10 10P1408.] EJM

190

The production of frozen concentrated starters.
Lloyd, G. T.
Food Technology in Australia 28 (1) 15, 35 (1976) [En] [CSIRO Dairy Res. Lab., Div. of Food Res., Highett, Victoria 3190, Australia]

Production of a unit culture of frozen concentrate equivalent to the inoculum for 4500 l. of milk is described. The concentrate is produced in the smallest possible volume (about 1 l.) and is free flowing thus avoiding a thawing step. It is added directly to the cheese vat, so eliminating bulk starter preparation in the cheese factory. Batch cultivation with pH control is used for the production of the streptococci biomass. Skim milk supplemented with yeast extract is used as the medium. Protein interference with the sedimentation of bacteria is overcome by dispersing the casein with sodium citrate prior to centrifuging or by treating the skim milk with trypsin which digests the casein during the media preparation stage. Optimum pH for growth of most of the strains is pH 6.0. Best yields are obtained by using ammonium hydroxide for pH control. The culture should be harvested just at the onset of the stationary phase of growth. Further growth is prevented by rapidly cooling the fermenter from its operating temp. of 30° C to 5° C and harvesting at this temp. The cells are frozen in shallow layers in liquid N_2 and stored at -110° C. They show no deterioration either in cell numbers or activity over a 12 months storage period. A shelf-life of 3 months is achieved at -40° C. This process has been extensively tested in pilot plant trials and attempts are now being made to scale up the process so that commercial trials can be carried out. VJG

191

Application of mixed starters in the production of Trappist cheese.
Obradovic, D.
XX International Dairy Congress **E**, 572 (1978) [2 ref. En] [Dairy Inst., Novi Beograd, Yugoslavia]

Trappist cheese made with a Micrococcus M104/Streptococcus lactis Ak-60 mixed starter had butyric, caproic and acetic acid contents of 2.5, 2.4 and 2.1 mg/100 g DM resp. at the beginning of ripening, and 5.4, 3.7 and 7.4 mg/100 g DM after 4 wk ripening. Total bacterial count developed normally and micrococci decreased during the 1st 10 days then increased again. The cheese had a normal flavour. [See FSTA (1978) **10** 10P1408.] CDP

192

Cultural characteristics of Leuconostoc strains from cheese starters.
Pearce, L. E.; Halligan, A. C.
XX International Dairy Congress **E**, 520-521 (1978) [2 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Leuconostoc strains with varying ability to ferment lactose had optimum growth temp. of 29-30° C in yeast/glucose/litmus milk, and gave max. cell mass at pH 5.2. Although they appeared to contribute to Cheddar cheese flavour during the 1st 14 days after manufacture, they had no significant effect on the flavour of the mature cheese. [See FSTA (1978) **10** 10P1408.] CDP

193

Studies on Leuconostoc citrovorum lactase.
Singh, H. P.; Rao, M. V. R.; Dutta, S. M.
XX International Dairy Congress **E**, 496-497 (1978) [En] [Nat. Dairy Res. Inst., Karnal, India]

Optimum pH and temp. were 6.5 and 60° C resp. for activity of purified lactase from Leuc. citrovorum 8081. The enzyme had a greater affinity for o-nitrophenyl β-δ-galactopyranoside than for lactose, and was inhibited by sulphydryl agents and heavy metal ions. [See FSTA (1978) **10** 10P1408.] CDP

194

Characterization of lactic streptococci in connection with cheese bitterness.
Choisy, C.; Lenoir, J.; Tourneur, C.; Gueguen, M.; Juras, M.; Rivault, D.
XX International Dairy Congress **E**, 492-493 (1978) [3 ref. En] [Lab. de Tech., Inst. Nat. Agron. Paris-Grignon, Thiverval-Grignon, France]

Bitter strains of lactic streptococci had a higher multiplication rate, higher proteolytic activity and lower proline-iminopeptidase activity than non-bitter strains. Values for these 3 properties were combined into an index that may prove of use for grading starter strains. [See FSTA (1978) **10** 10P1408.] JMD

195

Utilization of dried concentrates of lactic acid bacteria for commercial cheese manufacture.
Kornacki, K.; Kramkowska, A.; Stepaniak, L.; Bartoszewicz, E.; Rymaszewski, J.; Poznanski, S.; Pszczolkowska, G.
XX International Dairy Congress **E**, 590 (1978) [2 ref. En] [Production Lab. of Dairy Preparations, Olsztyn, Poland]

Dried concentrates were added at a rate of 1 g/100 l. milk in the manufacture of Tilsit and Edam cheeses; combinations of Streptococcus lactis, Str. diacetilactis, Str. cremoris and, for Edam cheese only, Lactobacillus casei were used. Compared with control cheeses, those made with the concentrates showed similar fermentation rates in the vat, had a normal taste and texture, and showed similar extent of paracasein degradation. [See FSTA (1978) **10** 10P1408.] CDP

196

Characterization of intracellular enzymes obtained from concentrates of dried lactic acid bacteria.
Rymaszewski, J.; Poznanski, S.; Pszczolkowska, G.
XX International Dairy Congress **E**, 521-522 (1978) [2 ref. En] [Univ. of Agric. & Tech., Olsztyn, Poland]

Spray-drying cultures of Streptococcus lactis, Str. diacetilactis, Str. cremoris or Lactobacillus casei, grown in a whey medium, had no significant effect on the properties and activity of proteolytic enzymes in the cells. [See FSTA (1978) **10** 10P1408.] MEG

197

Stimulation of Streptococcus thermophilus by the addition of lactase or extracts of lactobacilli to milk.
Hemme, D.; Vassal, L.; Auclair, J.
XX International Dairy Congress E, 513-514 (1978) [5 ref. En] [Lab. de Tech. Laitiere, INRA, Jouy-en-Josas, France]

Addition of Maxilact (commercial lactase from Saccharomyces lactis) to 10 strains of Str. thermophilus had a variable effect on growth in a milk medium. It is concluded that any stimulatory effect was due to proteolytic enzymes present in the Maxilact. Extracts of Lactobacillus helveticus, L. lactis or L. bulgaricus stimulated the majority of Str. thermophilus strains. [See FSTA (1978) **10** 10P1408.] MEG

198

Biochemical activity of bifidobacterium.
Kosikowska, M.
XX International Dairy Congress E, 549-550 (1978) [4 ref. En] [Inst. of Dairy Ind., Warsaw, Poland]

Morphological and biochemical characteristics of 4 strains of Lactobacillus bifidus were examined. A mixed starter composed of 4 bifidobacteria strains produced 0.77-0.90% lactic acid and 198 mg acetic acid/l. milk after 20 h incubation. The organoleptic quality of the fermented milk product was good. [See FSTA (1978) **10** 10P1408.] MEG

199

Preparation of freeze dried concentrated suspensions of lactic acid bacteria for cheese making.
Bouillanne, C.; Auclair, J.
XX International Dairy Congress E, 583 (1978) [2 ref. En] [Lab. de Tech. Laitiere, INRA, Jouy-en-Josas, France]

The characteristics of 25 freeze-dried suspensions, prepared from 4 mixtures each containing 4 different strains of mesophilic streptococci, are compared with those of 47 frozen starter suspensions. The freeze-dried suspensions have been used to prepare cheese starters. [See FSTA (1978) **10** 10P1408.] MEG

200

The antagonistic properties of lactobacilli against clostridia iso ated from cheese, feed and manure.
Korhonen, H.; Ali-Yrkkö, S.; Ahola-Luttila, H.; Antila, M.
XX International Dairy Congress E, 536-537 (1978) [10 ref. En] [Inst. of Dairy Sci., Univ. of Helsinki, Helsinki, Finland]

Lactobacilli, especially Lactobacillus bulgaricus, were inhibitory to vegetative cells and, to a slightly lesser extent, spores of clostridia. The inhibitory factor was a non-dialysable metabolic product that appeared in the growth medium and was stable for several days. [See FSTA (1978) **10** 10P1408.] CDP

201

Modified agglutination test for lactic streptococci.
Talbott, L. L.; Bluhm, L.
XX International Dairy Congress E, 352 (1978) [4 ref. En] [Fairmont Foods, Omaha, Nebraska, USA]

Filter-sterilized whey from renneted raw skim-milk is mixed with sterile 2,3,5-triphenyltetrazolium chloride and transferred to agglutination tubes. An inoculum of the test culture in Elliker's broth is added to the top of the agglutination tubes which are gently rotated and incubated at 32°C for 6 h. Positive agglutination is shown by a red precipitate at the bottom and red particles throughout the tube. [See FSTA (1978) **10** 10P1408.] CDP

202

The antibacterial effect of lactoferrin against lactobacilli, propionibacteria and clostridia.
Korhonen, H.; Ahonen, T.; Antila, M.
XX International Dairy Congress E, 537-538 (1978) [7 ref. En] [Inst. of Dairy Sci., Univ. of Helsinki, Helsinki, Finland]

Lactoferrin (LF) did not inhibit lactobacilli or propionibacteria with the exception of Lactobacillus bulgaricus which was weakly inhibited by ⩾ 10 mg LF/ml in the presence of 0.07M HCO_3^-. Of 5 species of clostridia, only Clostridium tyrobutyricum was inhibited by LF; ⩾ 1 mg LF/ml and 0.07M HCO_3^- were necessary for inhibition. [See FSTA (1978) **10** 10P1408.] CDP

203

[Fermentation as a protection against Clostridium botulinum.] [Lecture]
Lindgren, S.
SIK Rapport No. 410, 65-72 (1976) [7 ref. Sv] [Landbrukshogskolans Mikrobiol. Inst., Uppsala, Sweden]

The potential of bacterial fermentation for control of growth and toxin formation by Clostridium botulinum in foods is discussed, with special reference to lactic fermentation. Aspects considered include: mechanisms of antagonistic activity (competition for nutrients, reduction of the pH, formation of inhibitory substances, and alteration of the redox potential); organisms showing antagonistic activity towards Cl. botulinum (Pseudomonas aeruginosa, Cl. sporogenes, Enterobacteriaceae, Bacillus subtilis, Lactobacillaceae, Streptococcaceae, Brevibacterium linens); and possible practical applications, e.g. inoculation of packaged meat products with lactic acid bacteria. [See FSTA (1978) **10** 12C452]. AJDW

204

Preparation of fermented-milk type products using soymilk.
Kraidej, L.
Food 7 (4) 63-66 (1975) [En]

Fermented soymilk products were produced by substituting soybean milk for whole milk. A yoghurt-like product and a soybean "milk" drink

were prepared with various cultures. Best results were obtained with NRRL-B 1910 mixed with NRRL-B 1145 Lactobacillus culture for yoghurt, NRRL-B 1919 L. acidophilus for the milk drink, with 16-20 h fermentation at 37° C. Less inoculum and longer fermentation gave better texture and acidity in the end product. Although the product had reasonable keeping quality, the texture was not quite stable and the flavour was beany. The milk beverage was improved by homogenization, and was acceptable to a tasting panel. RM

205

[Step-by-step effect of ultraviolet irradiation on the lactic acid bacterium Lactobacillus delbrückii 30-1.]
Kalinina, V. I.; Bogatyreva, T. G.; Lysenko, A. M.
Prikladnaya Biokhimiya i Mikrobiologiya 13 (5) 714-716 (1977) [8 ref. Ru, en] [All Union Res. Inst. of Baking Ind., Moscow State Univ., Moscow, USSR]

Cell suspensions of L. delbrückii 30-1 (used for dough development) were subjected to UV irradiation at 450-7800 erg/mm^2 s. The suspensions in dilutions from 10^{-1} to 10^{-5} were then incubated for 2-3 days at 50° C on wort agar. Strains showing the greatest activity in terms of aldehyde production and titratable acidity were exposed to further irradiation. 3 strains produced by mutagenic irradiation at about 3000 erg/mm^2 s showed increased ability to synthesize aldehydes in a flour-malt medium. Certain strains exhibited increased lactic acid production. There were significant differences in aldehyde production between strains isolated after the 1st irradiation and those isolated after the 2nd. ADL

206

Effects of amino acids and small peptides on the acidification of milk by Streptococcus thermophilus.
Bracquart, P.; Lorient, D.; Alais, C.
XX International Dairy Congress E, 512-513 (1978) [En] [Lab. of Applied Biochem., Univ. of Nancy I, Nancy, France]

Lactic acid production was measured in milk, with added amino acids or peptides, incubated with 5 strains of Str. thermophilus. 6 single amino acids (Glu, Met, His, Arg, Phe, Try) were stimulatory and 6 were inhibitory. Di- and tripeptides often acted like mixtures of their constituent amino acids, but the inhibitory amino acids were less inhibitory in peptide form. [See FSTA (1978) **10** 10P1408.] JMD

207

[Automatic control of concentration of lactic streptococci in continuous culturing for preparation of bacterial concentrates.]
Vainberg, I. A.; Brusilovskii, L. P.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti No. 45, 44-48, 84 (1978) [4 ref. Ru] [VNIIMP, Moscow, USSR]

In continuation of previous studies [see FSTA (1976) 8 4P654] it was found that incorporation of a through-flow cuvette in the commercial LMF-72 nephelometer and turbidimeter enabled it to be used for the automatic continuous control of the growth of lactic streptococci. Continuous culturing of 2 strains of Streptococcus lactis and 1 of Str. acetoinicus in the laboratory installation described in FSTA (1976) 8 6P1001 was monitored using the modified LMF-72 apparatus; optical density of separate samples was measured with a FEK-56 photoelectric colorimeter. The correlation coeff. between the 2 methods was 0.97. The turbidimetric method using the modified LMF-72 apparatus is recommended for development for industrial application in preparation of bacterial concentrates. SKK

208

Study of batch and continuous cultivation of mesophilic lactic streptococci during bacterial concentrate production.
Bannikova, L. A.; Priidak, T. A.
XX International Dairy Congress E, 580-581 (1978) [En] [All-Union Inst. of the Dairy Ind., Moscow, USSR]

Lactose concn. was the growth-inhibiting factor for Str. lactis and Str. acetoinicus in a whey-based medium, optimum concn. for max. yield being 0.4-0.6% and 0.8-1.0% resp. Optimum parameters were established for batch cultivation, which was the best method for mixed Str. lactis/Str. acetoinicus culture, and for continuous cultivation of the 2 organisms separately. [See FSTA (1978) **10** 10P1408.] CDP

209

Microbial changes in milk stored at refrigeration temperature.
Natarajan, A. M.; Nambudripad, V. K. N.
XX International Dairy Congress E, 105-106 (1978) [En] [S. Regional Sta., Nat. Dairy Res. Inst., Adugodi, Bangalore, India]

Reduction of bacteriological quality of milk held at 5° C, and development of off-flavours after 24 and 72 h in farm and market milks resp. were due mainly to growth of psychrotrophic bacteria. Addition of a 200 × concentrated cell-free extract of L. acidophilus culture increased the shelf life of these milks by 48 h. [See FSTA (1978) **10** 10P1408.] CDP

210

[Production of lactic acid beverages from milk with low sugar content (ultrafiltered milk, delactosed milk and soya milk) using different microorganisms (Lactobacillus acidophilus, L. bifidus, L. bulgaricus and Streptococcus thermophilus).]
Rossi, J.; Costamagna, L.; Ingi, M.
Lait 58 (573/574) 155-172 (1978) [40 ref. Fr, en] [Istituto di Microbiol. Lattiero-Casearia, Fac. di Agraria di Perugia, Italy]

Cultured milks were prepared by incubation with lactic acid bacteria at 40° C for 5 h. Cultures were then cooled to 10° C, stored and sampled at

intervals < 150 days. Similar delicate acid flavours were produced in control and ultrafiltered milks but less flavour developed in delactosed milk; soy milk retained the flavour characteristic of its vegetable origin. Initial titratable acidities were highest in ultrafiltered and delactosed milks but acid development during storage was greatest in control milks. Soluble N contents were similar in all cultured milks despite large differences in initial total N. Numbers of L. acidophilus and Bifidobacterium bifidum remained constant during storage and were independent of the type of milk. The viability of L. bulgaricus in culture with Str. thermophilus varied according to the milk type and storage time. BAL

211

Preparation of dahi with improved flavour using a mutant of Streptococcus lactis subsp. diacetilactis.
Jasjit Singh; Kuila, R. K.; Ranganathan, B.; Bhatt, N. N.
XX International Dairy Congress E, 542 (1978) [3 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

When Str. lactis subsp. diacetilactis S-1 and a UV-induced mutant of it were used to prepare dahi from cows' milk, buffaloes' milk or reconstituted dried whole milk, samples prepared using the mutant obtained the highest organoleptic scores irrespective of type of milk. [See FSTA (1978) 10 10P1408.] CDP

212

Late blowing in cheeses made from uncooked curd.
Didienne, R.; Devoyod, J. J.
XX International Dairy Congress E, 760-762 (1978) [En] [Lab. de Recherches Fromageres, INRA, Aurillac, France]

Late-blown cheeses made from unscalded curd were examined. Those made from pasteurized milk contained 6.7×10^7 heterofermentative lactobacilli as the likely cause of the blowing. Those made from raw milk contained significant numbers also of leuconostocs, lactic streptococci and enterobacteria. [See FSTA (1978) 10 10P1408.] JMD

213

Peptide utilization by cheese starter streptococci.
Law, B. A.; Cliffe, A. J.
XX International Dairy Congress E, 511-512 (1978) [2 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Streptococcus cremoris and Str. lactis strains exhibited a variety of modes of peptide utilization varying from transport of intact peptides and intracellular hydrolysis to extracellular hydrolysis and amino acid transport. Some strains of Str. cremoris were unable to utilize peptides efficiently. [See FSTA (1978) 10 10P1408.] MEG

214

Separation of Streptococcus thermophilus and Lactobacillus bulgaricus from yoghurt cultures.
Johns, F. E.; Shapton, N.; Gordon, J. F.
XX International Dairy Congress E, 516-517 (1978) [4 ref. En] [Express Dairy Co. Ltd., London, UK]

Yoghurt cultures were grown at 37°C on 4 media: lactic phage enumeration agar; plate count agar supplemented with reconstituted skim-milk (PCA); de Man, Rogosa ° Sharpe agar; and reinforced clostridial agar (RCA). Str. thermophilus could be isolated after 24 h on PCA at pH 7.0; L. bulgaricus could be isolated after 48-96 h on RCA at pH 5.5. [See FSTA (1978) 10 10P1408.] JMD

215

Proteinase and peptidase activities of yoghurt starter bacteria.
Shankar, P. A.; Davies, F. L.
XX International Dairy Congress E, 467-468 (1978) [En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

The weak protease activity of Streptococcus thermophilus cells is complemented in mixed cultures by the high protease activity of Lactobacillus bulgaricus cells. Conversely, Str. thermophilus produces high levels of cell bound and free dipeptidases (not detected in L. bulgaricus) that enable it to hydrolyse peptides to amino acids. [See FSTA (1978) 10 10P1408.] MEG

216

Interrelationships of Streptococcus thermophilus and Lactobacillus bulgaricus in yoghurt starters.
Shankar, P. A.; Davies, F. L.
XX International Dairy Congress E, 514-515 (1978) [2 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

L. bulgaricus produced peptides that were stimulatory to Str. thermophilus; comparable stimulation was achieved with a mixture of 6 amino acids (Val, Glu, Try, Met, His, Leu). Str. thermophilus could produce up to 40 p.p.m. formate; 30-35 p.p.m. was necessary to produce the stimulation of L. bulgaricus found in mixed cultures, but yoghurt milk contains only 2-4 p.p.m. Acetaldehyde was also estimated in cultures. [See FSTA (1978) 10 10P1408.] JMD

217

Bacteriophage of Lactobacillus bulgaricus as a cause of slowness in yoghurt manufacture.
Peake, S. E.; Stanley, G.
XX International Dairy Congress E, 833-834 (1978) [2 ref. En] [Unigate-Tech. Cent., Bradford-on-Avon, Wilts, UK]

Bacteriophage of L. bulgaricus was demonstrated by inhibition of the organism by yoghurt filtrate that was shown to contain < 0.01 IU penicillin/ml. Electron micrographs of ultracentrifugal sediment

confirmed the presence of phage with hexagonal heads of 60 nm diam. and tails 210 nm long. [See FSTA (1978) 10 10P1408.] JMD

218

Direct vat inoculation of milk with freeze-dried starters for making Cheddar cheese.
Chapman, H. R.; McIntyre, H.; Scurlock, E. M. W.
XX International Dairy Congress E, 590-591 (1978) [En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Freezed-dried starters of Streptococcus lactis + Str. cremoris, prepared by VITEX, Paris, were used for direct vat inoculation in the manufacture of Cheddar cheese, using a renneting temp. of 31°C and cooking temp. of 41°C. The cheese was of good quality. The method has attractive possibilities for industrial application. [See FSTA (1978) 10 10P1408.] JMD

219

Heterogeneity among strains of lactic streptococci.
Limsowtin, G. K. Y.; Heap, H. A.; Lawrence, R. C.
New Zealand Journal of Dairy Science and Technology 13 (1) 1-8 (1978) [11 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Heterogeneity within lactic streptococcal cultures was studied with respect to acid production and phage sensitivity. All 7 strains examined were found to accumulate slow coagulating variants at different rates, depending upon the growth media used. Maintenance of cultures in M17 broth [Applied Microbiology (1975) 29 (6) 807-813] resulted in a significant accumulation of slow coagulating variants for most strains studied. In all but 1 strain investigated, variants were detected which exhibited different phage sensitivities. When isolates from these cultures were examined 4 phenotypes were observed: variants exhibiting host modification and restriction of phages; variants which adsorbed but did not form plaques (with $\geqslant 1$ particular phage); variants resistant against $\geqslant 1$ particular phage; and variants sensitive to different phages. Generally only 1 or 2 of these phenotypes were recovered from any 1 strain, but a detailed investigation of Streptococcus cremoris 108 showed that all 4 phenotypes were present. The appearance of these variants was dependent upon the nature of the subculturing medium, being much more rapid in M17 broth than in autoclaved reconstituted skim-milk. The commercial importance of these findings is discussed. AS

220

Lactate production and citrate dissimilation in milk by different mesophilic starters.
Cogan, T. M.
XX International Dairy Congress E, 506-507 (1978) [1 ref. En] [Agric. Inst., Moorepark Res. Cent., Fermoy, Co. Cork, Irish Republic]

Generation times for 2 strains of Streptococcus cremoris, 2 of Str. lactis, 3 of Str. lactis subsp. diacetylactis and 7 mixed strain starter cultures ranged from 1.9 to 2.7 h. Lactate production at the end of the exponential phase, reached in 12.8 to 15.4 h, varied from 0.3 to 0.5%. Results suggest that cultures may often be over-incubated with subsequent loss of ability to produce lactate. [See FSTA (1978) 10 10P1408.] MEG

221

Activity of Streptococcus diacetilactis and its UV-induced mutant in dahi prepared from different types of milk.
Singh, J.; Bhatt, N. N.; Kuila, R. K.; Ranganathan, B.
Journal of Food Protection 41 (4) 275-276 (1978) [11 ref. En] [Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal 132001 (Haryana), India]

Streptococcus diacetilactis (strain S-1) and one of its UV-induced mutants (PM-1) were individually used to prepare dahi from cows' and buffalos' milk and reconstituted full-cream dried cows' milk. Dahi samples were analysed for titratable and volatile acidities, diacetyl content and proteolytic activity. Each sample was evaluated organoleptically, and acceptability of the product was measured by the 9-point hedonic scale. The dahi prepared with the mutant scored better in all the types of milk used, as compared to the parent culture. AS

222

[Study of bacteriophages of thermophilic lactic streptococci.]
Koroleva, N. S.; Bannikova, L. A.; Mytnik, L. G.; Bespalova, I. A.
Molochnaya Promyshlennost' No. 3, 6-9 (1978) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Because of recent incidence of slow starters in commercial production in the USSR of ryazhenka and 'Snezhok' beverage using thermophilic lactic streptococci, 57 Streptococcus thermophilus strains were studied. Starters, finished products, and rinsings from equipment, floors, walls and glassware of dairy plants were examined for presence of relevant bacteriophages. 2 strains of Str. thermophilus isolated from ryazhenka and 'Snezhok' and from industrial starters used in their manufacture proved susceptible to phages present in the materials examined. In all, 8 Str. thermophilus phages were isolated; 1 of them, phage F_t, isolated from an industrial starter was studied in detail; in sensitive cultures, it formed small (0.1-0.2 mm diam.), round, transparent plaques and lysed 41 (72%) of the 57 strains or strain combinations tested; electron microscopy showed that it was present in 2 types, both belonging to phages with negative staining tails. The phages were specific for Str. thermophilus strains and did not lyse any of the mesophilic lactic streptococci cultures tested. Use of Cl solutions in the affected premises inactivated the phages present there in slow-starter periods. SKK

223

Survival of Lactobacillus acidophilus in 'sweet acidophilus milk' during refrigerated storage.
Young, C. K.; Nelson, F. E.
Journal of Food Protection 41 (4) 248-250 (1978) [10 ref. En] [Dep. of Nutr. & Food Sci., Univ. of Arizona, Tucson, Arizona 85721, USA]

Samples of 3 brands of commercial 'Sweet Acidophilus Milk' were obtained directly from the processors and evaluated periodically for microbial, chemical, and flavour changes during 23-24 days of storage at 4 ± 2° C. Counts of Lactobacillus acidophilus decreased from 2.6×10^6-6.4×10^6/ml initially to 5.1×10^4-3.1×10^6/ml at the end of the study. Several samples dropped below 2×10^6 viable L. acidophilus before the sell-by date was reached. Final contaminant counts were 10^6-10^8/ml in all samples, but rate of decline of L. acidophilus was not directly related to growth of contaminants. Titratable acidity and pH changed very little, and yeast and mould growth was minor. Notable off-flavours developed in 14-21 days.
AS

224

Enumeration of Lactobacillus acidophilus with the agar plate count.
Collins, E. B.
Journal of Food Protection 41 (6) 439-442 (1978) [En] [Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Higher plate counts on MRS agar were obtained under anaerobic than aerobic conditions for 3 of 4 strains of Lactobacillus acidophilus and commercially prepared nonfermented acidophilus milks (products A and B) made with 2 of the strains. Average values for aerobic counts of products A and B were 87 and 60%, resp., of those for corresponding anaerobic counts. Incubation of plates poured with MRS agar for 72 ± 3 h at 37° C was sufficient for maximal counts. 2 strains and the nonfermented acidophilus milks gave highest counts on Standard Methods Agar (SMA). Greatest numbers of bile-resistant colonies were indicated by MRS agar (with 0.2% oxgall). The average of plate counts for products A and B determined on MRS agar with oxgall was 65% of that for corresponding plate counts determined on MRS without oxgall. Buffered distilled water, 0.9% NaCl, and 1% peptone each served satisfactorily as diluent. Overlaying MRS agar in poured plates with additional medium was not advantageous. Plate counts of samples that had been frozen and stored at -26° C or in dry ice were as high as those of duplicate samples that had been stored at 1.7° C. AS

225

[Determination of chemical composition of volatile carbonyl compounds produced by pure cultures of lactic acid bacteria.]
Goryaev, M. I.; Kenzhebekov, P. K.; Ul'yanov, S. D.; Rskeldiev, B. A.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 39-41 (1977) [5 ref. Ru] [Semipalatinskii Filial Dzhambulskogo Tekh. Inst. Legkoi i Pishchevoi Promyshlennosti, Semipalatinsk, USSR]

In view of the ability of Lactacillus plantarum (str 70) and Streptococcus diacetilactis (str 137) to produce substances strengthening the aroma and taste of sausage products, qualitative and quantitative GLC detn. was made of the volatile carbonyl compounds produced by these bacteria after 2, 5, and 10 days incubation on sterile meat-peptone agar at 24-26° C, as compared with those in the original sterile medium alone. The results are tabulated. 10 newly formed compounds were detected, in addition to 10 in the original medium. At 5 days, when all compounds showed marked increases in comparison with 2 days, the predominant constituents (21.36-46.25 mg-equiv. × 10^{-4}/100 g) included caproaldehyde, crotonaldehyde, isobutyraldehyde, acrolein and (not found in the original medium) formaldehyde, diacetyl and glyoxal. By 10 days, amounts of all compounds had decreased, with the exception of crotonaldehyde. MJD

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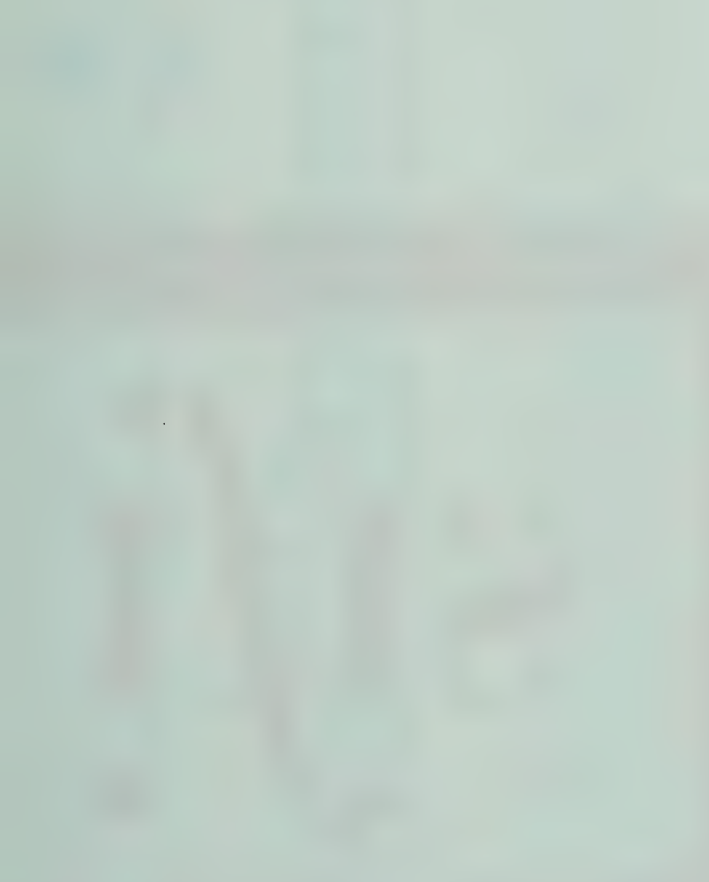
LACTIC ACID BACTERIA IN BEVERAGES AND FOOD

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H. BROOKES

EDITOR

1

Antibacterial activity of lactic acid bacteria. I. Activity of silage, a cereal starter and isolated organisms.
Lindgren, S.; Clevström, G.
Swedish Journal of Agricultural Research 8 (2) 61–66 , (1978) [26 ref. En] [Dep. of Microbiol., Univ. of Agric. Sci., S-750 07 Uppsala, Sweden]

2

Antibacterial activity of lactic acid bacteria. II. Activity in vegetable silages, Indonesian fermented foods and starter cultures.
Lindgren, S.; Clevström, G.
Swedish Journal of Agricultural Research 8 (2) 67–73 (1978) [8 ref. En] [Dep. of Microbiol., Univ. of Agric. Sci., S-750 07 Uppsala, Sweden]

Studies on antibacterial activity of lactic acid bacteria isolated from silage, sourdough, fermented cucumbers, starters, and Indonesian fermented foods (Tape, prepared from rice; and Kecap and Tauco, prepared from soybeans) are described. Antibacterial activity of cell-free culture filtrates was evaluated by the gel-diffusion test and that of dialysed filtrates was evaluated by a turbidimetric method, the former method revealing activity of low mol. wt. substances, and the latter the existence of high mol. wt. factors. Test organisms were Streptococcus cremoris, Staphylococcus aureus, Bacillus subtilis, Clostridium perfringens and Pseudomonas aeruginosa. Tables and block diagrams of results are given. Data concerning activity of low mol. wt. substances showed some culture filtrates of organisms from Kecap and Tauco to contain substances with activity against Staph. aureus and B. subtilis; filtrates of isolates from the other materials tested showed little or no antibacterial activity attributable to low mol. wt. constituents. Studies on high mol. wt. inhibitors showed Kecap and Tauco isolates to have good activity against Gram-positive organisms, but not against Ps. aeruginosa. Isolates from Tape showed good activity only against Strep. cremoris and Staph. aureus. Isolates from sourdough, fermented cucumbers and starters showed activity only against Strep. cremoris. The relationship of antibacterial activity to acid formation is discussed, and pH and temp. inactivation of the antibacterial activities is considered. [See preceding abstr. for part. I.] AJDW

3

Use of naturally occurring antimicrobials to preserve non-fermented refrigerated foods.
Go, H. C.
Dissertation Abstracts International, B 38 (6) 2602–2603: Order No. 77-25769, 117pp. (1977) [En] [N. Dakota State Univ., Fargo, N. Dakota 58102, USA]

Antimicrobial substances produced by Streptococcus diacetilactis DRC-1 and Leuconostoc citrovorum 3036 were investigated. Lactic or acetic acids accounted for most of the inhibitory activity found in the L. citrovorum culture liquor; 20–30 % of the antimicrobial activity from S. diacetilactis culture liquor was due to ninhydrin-positive substances. 2 % lyophilized cell-free culture liquor from S. diacetilactis inhibited growth of Pseudomonas fluorescens and of a Gram-negative species in skim-milk stored at 7° C for 2–3 wk, but did not prevent proteolysis. Growth of the Gram-negative species in a beef homogenate and growth of Gram-negative psychotrophs in a fish homogenate were also inhibited and proteolysis was prevented. Addition of 0.1–0.8 % of a proteolytic enzyme inhibitor from potatoes did not inhibit growth of P. fluorescens in skim-milk or of the Gram-negative species in beef homogenate, but proteolysis was prevented. MEG

4

[Berlin 'White' beer.] Die Berliner Weisse.
Strobl, A.
Brauwelt 118 (32) 1171–1173 (1978) [2 ref. De]

Traditional Berlin 'White' beer, a top-fermented lactic acid-containing beer, is described. Characteristics include: original gravity 7.5%; alcohol content 2.0%; CO_2 content 0.6%; foam value 120 s; pH 3.2; lactic acid content 2.6 g/l.; and calorific value 270 kcal/l. Historical aspects of lactic acid-containing beers are briefly discussed, with reference to Trappist beer, Bantu beer, Tibetan Chang beer, and kvass. Possible beneficial effects of consumption of lactic acid are briefly considered. TUB-IGB

5

[Rivella AG, Rothrist.] Rivella AG Rothrist.
Anon.
Tara 29 (330) 65–69 (1977) [De]

An account is given of the development of Rivella AG, the Swiss manufacturer of soft drinks with a distinct lactic acid flavour. A description of their new factory, capable of producing 20 000 l. bottles/h, includes a flow diagram of the Rivella production line. HBr

6

[Nutritional requirements of hiochi bacteria at high alcohol concentrations. III. Requirement of organic acid as substitute for sodium acetate.]
Takeda, M.; Higashi, K.; Nishimura, M.; Nakazato, A.; Tsukahara, T.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 73 (3) 226–228 (1978) [9 ref. Ja, en] [Tokyo Univ. Agric., Setagaya-ku, Tokyo, Japan]

Pyruvic acid, oxaloacetic acid, and α-ketoglutaric acid were required by the hiochibacteria Lactobacillus H 34, L. heterohiochii No. 59, H-1, and L. homohiochii S 51, and malic acid and citric acid (at the early stages of growth) were required by No. 59, instead of sodium acetate. [See FSTA (1978) 10 9H1113 for part II.] YN

7

[Nutritional requirement of hiochi bacteria at high alcohol concentrations. IV. Detection of effective components in yeast extract.]
Higashi, K.; Takeda, M.; Tsukahara, T.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 73 (4) 301–303 (1978) [11 ref. Ja, en] [Tokyo Univ. Agric., Setagaya-ku; Tokyo, Japan]

The growth promoting effect of yeast extract for Lactobacillus hiochii No. 59 was lost by heating at 120° C for 2 h and treating at pH <3.0 and pH >10.

The effective components were capable of undergoing dialysis, not extractable with ether, soluble in 70% ethanol at pH 3.0, and adsorbed on active C and a strongly acidic cation exchange resin. The ethanol soluble fraction was subjected to column chromatography on Dowex 50W-X16, eluting with 0.5-N NH_4OH, and the eluate fractionated by Sephadex G-25. The growth promoting components were presumed to be some peptides. [See preceding abstr. for part III.] YN

8

[Nutritional requirement of hiochi bacteria at high alcohol concentrations. V. Separation of effective peptides from yeast extract.]
Higashi, K.; Takeda, M.; Tsukahara, T.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 73 (4) 304-306 (1978) [5 ref. Ja, en] [Tokyo Univ. Agric., Setagaya-ku, Tokyo, Japan]

The growth promoting effect of yeast extract for Lactobacillus hiochii was found in a neutral peptide fraction of yeast extract. The neutral peptide fraction was subjected to gel filtration on Sephadex G-25 and separated into 2 fractions effective for L. heterohiochii and L. homohiochii, resp. The fractions showed ninhydrin positive spots on a paper chromatogram. [See preceding abstr. for part IV.] YN

9

Fermentation of peanut milk with Lactobacillus bulgaricus and L. acidophilus.
Beuchat, L. R.; Nail, B. J.
Journal of Food Science 43 (4) 1109-1112 (1978) [15 ref. En] [Dep. of Food Sci., Univ. of Georgia Agric. Exp. Sta., Experiment, Georgia 30212, USA]

Several extraction procedures were examined for their suitability to yield desirable peanut milks for fermentation by 4 strains of lactic acid bacteria. Studies revealed that a procedure in which peanuts were soaked in 1.0% sodium bicarbonate for 16-18 h, drained, washed with tap water, ground, steeped for 4-5 h in tap water, and filtered, resulted in milk most desirable for fermentation. Addition of lactose (2%) to pasteurized peanut milk before fermenting with Lactobacillus bulgaricus NRRL B-1909 and L. acidophilus NRRL B-1910 for 3 days at 37° C resulted in a custard-like product having 0.38-0.53% titratable acidity at pH 4.76-4.43, resp. Sensory panel evaluations of blended, fermented peanut milks containing added sucrose (2%) and fruit flavourings showed that the products were acceptable and competed favourably with flavoured buttermilk. Fermented peanut milk substituted for buttermilk in a corn muffin recipe resulted in products with organoleptic characteristics not significantly ($P < 0.05$) different from those of the control. Further investigations are required to determine the optimum conditions for preparing fermented peanut milk products. IFT

10

[Studies on the production of watermelon and cantaloupe melon juice.]
Shin, D. H.; Koo, Y.-J.; Kim, C.-O.; Min, B.-Y.; Suh, K.-B.
Korean Journal of Food Science and Technology 10 (2) 215-223 (1978) [8 ref Ko, en] [Food Res. Inst., Agric. & Fishery Development Corp., Seoul, S. Korea]

Studies were conducted to determine the feasibility of preservation of watermelon and cantaloupe melon in the form of natural juice or lactic fermented juice. The average yield of juice obtained from watermelon and cantaloupe melon were 56.2 and 65.8%, resp. of the fresh wt. The colloidal components of watermelon juice separated from the juice by sedimentation within 24 h. Cantaloupe melon juice gave a stable colloidal dispersion. No change in the colour of the juices was detected by sensory evaluation or instrumental methods after they were treated at 100° C for 5 min. The addition of cane sugar to give a TS content of 11/13° Brix gave juices which were preferred by most tasters. Lactic fermentation of natural juices pasteurized at 90° C for 5 min., and inoculated with a pure culture of lactic acid bacteria proceeded without interference from competing microorganisms. Sensory evaluation of lactic fermented juices indicated that 60% of tasters found the juices as acceptable as or better than commercial fruit nectars at present on the market. Taste panels showed a preference for natural melon juices over the lactic fermented juices. The peroxidase activity of cantaloupe melon juice was higher than that of watermelon juice, with juice extracted from the core of the fruit showing a higher activity than that from other portions of the tissue. Two types of peroxidase, of differing heat stability, were detected in both juices. The more heat stable peroxidase had a decimal reduction time of 40 min at 80° C and a Z value of 11° C. AS

11

[Control of microbiological contamination of bakery products.]
Mogilko, I. P.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 2, 40-41 (1978) [Ru]

Lactic acid gives good protection against mould attack and ropiness of bakery products, but is not used widely in practice. Moulds and ropiness are also controlled by whey. Lactic acid added as 0.2-0.3% of flour wt. is highly bactericidal, and products made from flour with weak gluten are improved, as shown by a table. The lactic acid influences the hydrolytic processes in the saccharides; the starch is partly hydrolysed, and dextrins, maltose and glucose are produced. The recipe sugar is subject to inversion, whereby aging of products is retarded. Products with added lactic acid are able to withstand prolonged storage, and weak gluten flour can be used; ropiness and moulds are controlled. STI

12

[Lactobacillus acidophilus in A38 cultured milk.]
Skovdal, B.; Wedo, E.
Dansk Veterinaertidsskrift 61 (3) 105-107 (1978) [6 ref. Da] [Miljo- og Levnedsmiddelkontrolenhed Slagelse, Ringsted Afdeling, Sct. Knudsgade 3, 4100 Ringsted, Denmark]

Samples of A38 L. acidophilus cultured milk produced at a Danish dairy were tested regularly at a laboratory. Viable lactobacilli were successfully detected by cultivation at 37° C for 4 days on Rogosa Agar (Merck, Darmstadt) at pH 5.5, or on Tomato Juic Agar (Oxoid) at pH 6.1. No growth of lactobacilli coul

be obtained on Sorbic Acid Agar (Merck), reconstituted according to the manufacturer's instructions, but this medium proved suitable for routine detection of L. acidophilus if a modified form of heat treatment was used in its reconstitution. Over 3 million lactobacilli/ml were detected both in the freshly produced milk and at the expiry date. ADL

13

Amino acid decarboxylase activity of bacteria isolated from different varieties of cheese. [Abstract]
Edwards, S. T.; Sandine, W. E.
Journal of Dairy Science **61** (Suppl. 1) 101 (1978) [En]
[Oregon State Univ., Corvallis, Oregon 97331, USA]

Out of 147 organisms isolated from commercial cheeses, a Streptococcus sp. from Blue cheese had the highest tyrosine decarboxylase activity, a Streptococcus sp. from Münster cheese had the highest histidine decarboxylase activity and a Lactobacillus sp. from Cheddar cheese had the highest tryptophan decarboxylase activity. In the Ames test, none of these amines was found to be mutagenic. MEG

14

Interaction of bacteriophage infection and low penicillin concentrations on the performance of yogurt cultures.
Verhue, W. M.
Applied and Environmental Microbiology **35** (6) 1145–1149 (1978) [29 ref. En] [Unilever Res., Vlaardingen, Netherlands]

Bacteriophage infection of a Streptococcus thermophilus culture containing 2 strains, one of which is phage sensitive and the other phage resistant, may induce lysis of both strains. Experiments were carried out with 3 different phage-resistant strains. One such strain lysed in penicillin-free growth medium and another needed penicillin G (0.005 IU/ml) for lysis, while the 3rd strain continued to grow in the presence of this concn. of antibiotic. Growth of the latter strain was inhibited when the medium contained a relatively high concn. of phage lysin. The different penicillin concn. required to induce "lysis from without" of these phage-resistant strains correlated with their individual sensitivities to the antibiotic. The apparent relationship between the sensitivities of these strains to penicillin and to phage lysin could be explained by a difference in the degree of polymerization of the cell wall peptidoglycan. AS

15

Calorimetric identification of several strains of lactic acid bacteria.
Fujita, T.; Monk, P. R.; Wadsö, I.
Journal of Dairy Research **45** (3) 457–463 (1978) [7 ref. En] [Thermochem. Lab., Chem. Cent., Univ. of Lund, Lund 7, Sweden]

Thermograms were compared for 9 different strains of lactic acid bacteria (**Streptococcus cremoris** 703, **S. cremoris** 609 RW, **S. lactis** 38, **S. diacetilactis** 65, **Leuconostoc cremoris** 80 **S. thermophilus** CNRZ 302, **Lactobacillus bulgaricus** CNRZ 86, **L. helveticus** CNRZ 303 and **L. acidophilus** 1748) grown in a complex or chemically-defined medium. 1 ml of a freshly-inoculated culture was incubated at 37° C (or at 30° C in the case of **S. cremoris** 609 RW) in a hermetically sealed stainless steel ampoule, and the increase in heat effect was recorded in 'gmW/ml. A clear difference in growth patterns between all 9 strains was observed. A better differentiation between strains was obtained when a defined medium was used rather than the complex medium. Under carefully controlled conditions of growth, thermograms provide a rapid method for identification of strains of lactic acid bacteria commonly used in the dairy industry. MEG

16

[Variation of phage resistance of Streptococcus cremoris upon lysis with virulent phage.] Variation der Phagenresistenz bei Streptococcus cremoris unter dem Einfluss von virulenten Phagen.
Fröhlich, G.; Degle, I.; Busse, M.
Milchwissenschaft **33** (7) 428–431 (1978) [8 ref. De, en]
[Bakteriologisches Inst. der Süddeutschen Versuchs- & Forschungsanstalt für Milchwirtschaft, Weihenstephen, Federal Republic of Germany]

17

Isolation and some characteristics of phages of ropy strains of Streptococcus lactis.
Sozzi, T.; Poulin, J. M.; Maret, R.; Pousaz, R.
Milchwissenschaft **33** (6) 349–352 (1978) [4 ref. En, de]
[Dep. of Tech. Development, Nestle Products Technical Assistance Co. Ltd., Lausanne, Switzerland]

Bacteriophage (sl 122) of a ropy strain of S. lactis was isolated from an infected commercial starter containing both ropy (SL 122) and non-ropy (SL 123) strains. SL 122 was also sensitive to a second phage (sl 60) isolated from a non-ropy strain. The polysaccharide produced by ropy strains apparently confers no resistance to phage attack. The lytic spectrum of these and 5 other phages was tested using 9 strains of S. lactis; only 2 lysed strains other than their homologous hosts. Ropy strain SL 122 spontaneously produced a non-ropy variant (SL 124) resistant to sl 122 but sensitive to sl 123. Since phages sl 122 and sl 123 multiplied at pH 4, phage control could not be effected by the introduction of fast acidifying strains of S. lactis. FLD

18

Microorganisms and their instability in milk and milk products. [Lecture]
McKay, L. L.
Food Technology **32** (5) 181–185 (1978) [20 ref. En]
[Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

The appearance of mutants of lactic streptococci lacking proteinase system and/or the ability to ferment lactose is discussed. Evidence is presented that indicates that a plasmid of about 10 million daltons is responsible for proteinase activity and one of about 30 million daltons for lactose fermentation. Other areas in which plasmids may be responsible for instability in microorganisms are mentioned. [See FSTA (1979) 11 1B3]. CDP

19

Reduction of nitrate in a meat system by Lactobacillus plantarum.
Smith, J. L.; Palumbo, S. A.
Journal of Applied Bacteriology 45 (1) 153–155 (1978) [11 ref. En] [Eastern Regional Res. Cent., Philadelphia, Pennsylvania 19118, USA]

Nitrate was reduced to nitrite in Difco Tryptic Nitrate medium by 4 of 6 strains of L. plantarum, by 3 Lactobacillus spp. and 2 Leuconostoc spp. Frozen starter cultures, Lactacel DS (L. plantarum) and Lactacel MC (Pediococcus acidilactici + L. plantarum) were also able to reduce nitrate in the Trypic Nitrate medium, whereas Lactacel (P. acidilactici) did not. When Lactacel was used to inoculate a meat system (autoclaved beef ground to a paste) containing nitrate, only small amounts of cured-meat pigment were formed. Inoculation with Lactacel DS or Lactacel MC produced good cured meat colour due to the reduction of nitrate to nitrite by L. plantarum. MEG

20

Variability in rates of pH fall and lactate production in the muscles of cooling beef carcasses.
Bendall, J. R.
Meat Science 2 (2) 91–104 (1978) [21 ref. En] [Meat Res. Inst., Langford, Bristol, UK]

11 Hereford or Hereford/Friesian cross heifer carcasses (wt. 250 ± 20 kg) were used in a study on changes in muscle pH during post-mortem cooling. Tables and graphs are given showing pH decline in the longissimus dorsi, triceps brachii, gluteo-biceps and semimembranosus muscles. Considerable variability in pH decline was observed. It is unlikely that differences in muscle temp. could account for this variation; even after correction of data to a standard temp. of 38° C, rate of pH decline varied by a factor of approx. 2. Similar variability was observed in excised triceps brachii muscles held at a constant temp. of 38° C. Extreme variability between muscles within a single carcass was also observed, as was variability between sides of a single carcass. A further 6 carcasses were used in a study on the variability of lactate formation and phosphocreatine and ATP decomposition during cooling of a carcass for ≤7 h; considerable variability in rates of changes in concn. of these constituents were observed. Possible reasons for the variability of rates of ATP decomposition (and consequent pH changes) are discussed,with special reference to actomyosin ATP-ase and Ca-pump ATP-ase activities. AJDW

21

Folate levels in food - a comparison of microbiological assay and radioassay methods for measuring folate.
Ruddick, J. E.; Vanderstoep, J.; Richards, J. F.
Journal of Food Science 43 (4) 1238–1241 (1978) [26 ref. En] [Dep. of Food Sci., Univ. of British Columbia, Vancouver, British Columbia, Canada]

Concn. of N^5-methyltetrahydrofolic acid (N^5-MTHFA) were determined by the radioassay and the Lactobacillus casei microbiological assay methods. The correlation coeff. for samples analysed by both methods was 0.93. The radioassay method was found to be faster, simpler and more accurate than the microbiological method. The milk folate binder and L. casei were found to react differently to pteroylglutamic acid compared to N^5-MTHFA acid. The 2 methods are suitable only for measuring the form of folate used to construct the standard curve for the assay. Therefore, neither method can be used to accurately quantitate folate levels in foods. IFT

22

Galactose metabolism in Bifidobacterium bifidum. [Lecture]
Lee, L.; Terao, S.; Tochikura, T.
International Congress of Food Science & Technology - Abstracts p.270 (1978) [En] [Dep. of Food Sci. & Tech., Kyoto Univ., Sakyo-ku, Kyoto 606, Japan]

2 pathways appeared to be involved in galactose metabolism by B. bifidum: the conventional Leloir pathway; and a pyrophosphorylase pathway in which galactose-1-phosphate could be converted to glucose-1-phosphate without participation of transferase. [See FSTA (1979) 11 2A60.] CDP

23

Fate of aflatoxin B_2 in a two-step microbial recovery system for food industry wastes.
Johnson, K. M.; Busta, F. F.
Journal of Food Science 43 (4) 1303–1306 (1978) [16 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, 1334 Eckles Avenue, St. Paul, Minnesota 55108, USA]

The fate of aflatoxin B_2 in a 2-step microbial process for the recovery of single cell protein (SCP) was determined. Bacillus subtilis A was used to hydrolyse a protein-starch medium for subsequent growth of Lactobacillus acidophilus Farr. Growth of L. acidophilus in the modified medium was 100-fold greater than in the initial medium. The medium was spiked with 800 parts/billion aflatoxin, and high pressure liquid chromatography was employed for quantification of residual aflatoxin. Extraction efficiency of the aflatoxin was 72.4%. No differences were noted in the amounts of aflatoxin present after any of the treatments. IFT

24

[Nutrient medium for accumulating a biomass of the lactic acid bacteria Streptococcus lactis, Streptococcus acetoinicus and Lactobacillus acidophilus.]
Lagoda, I. V.; Priidak, T. A.; Bannikova, L. A. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 591 499 (1978) [Ru]

The medium comprises (% by wt.): whey 10–20, maize extract 0.5–2.0, sodium citrate 1.0–2.0, $MnSO_4$ 0.016–0.164, and water. The maize extract is used as the source of N compounds to increase bacterial growth rate and to simplify preparation of the medium. W&Co

25

[Fermentation of gluconic acid by lactic acid bacteria isolated from wine.] Gluconsäurevergärung durch Milchsäurebakterien des Weines.
Radler, F.; Schönig, I.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 167 (3) 165–170 (1978) [31 ref. De, en] [Inst. für Mikrobiol. & Weinforschung der Johannes-Gutenberg-Univ. Mainz, Ernst-Ludwig-Strasse 10, D-6500 Mainz, Federal Republic of Germany]

The fermentation of gluconic acid was investigated in 116 different strains of lactic acid bacteria belonging to the genera Lactobacillus, Leuconostoc, Pediococcus and Streptococcus. Most of the strains were isolated from wine. Gluconic acid was fermented by nearly all spp. of the genus Lactobacillus (belonging to the subgenera Streptobacterium and Betabacterium) and by most strains of Leuconostoc. The pediococci did not ferment gluconic acid. Growing cultures and resting cells of Lb. brevis, Lb. casei and Leuc. oenos formed lactic acid, acetic acid, ethanol and CO_2 from gluconic acid. Lactic acid was formed in about equimolar amounts from gluconic acid. Lb. brevis and Leuc. oenos metabolized completely 0.5 g gluconic acid and 4.5 g of malic acid/l. when cultured in a medium consisting of wine and a small amount of yeast extract (at pH 3.5). AS

26

A new strain of Leuconostoc oenos for induced malo-lactic fermentation in Eastern wines.
Beelman, R. B.; Gavin, A.; Keen, R. M.
American Journal of Enology and Viticulture 28 (3) 159–165 (1977) [21 ref. En] [Dep. of Food Sci., Pennsylvania State Univ., University Park, Pennsylvania 16802, USA]

A bacterium, isolated from a red table wine made in the laboratory from French-hybrid grapes grown in Pennsylvania following a spontaneous malo-lactic fermentation, was characterized as Leuconostoc oenos and was given the strain designation, PSU-1. It was found to be quite similar in most biochemical characteristics to L. oenos ML-34, a commonly studied strain which was isolated from a California wine. ML-34 and PSU-1 were compared for their growth characteristics in a complex laboratory medium modified to simulate some of the conditions which limit the growth of bacteria in wine. It was found that ML-34 always grew as well as or slightly better than PSU-1 with variations in pH, added ethanol, added SO_2 and different incubation temp. 2 separate experiments were conducted to compare the strains for induced malo-lactic fermentation by pure culture inoculation into Pennsylvania red table wines. In the 1st experiment, 3 wines made from blends of hot-pressed Pennsylvania musts were passed through 0.5 μm filters prior to inoculation. PSU-1 induced malo-lactic fermentation in 2 of these wines within 11.9 and 15.3 wk following inoculation, while ML-34 failed to induce malo-lactic fermentation within 50 wk in all 3 wines. In the 2nd experiment, bacteria were inoculated into 3 varietal red Pennsylvania wines made using traditional vinification procedures. 2 of the 3 var. inoculated with PSU-1 completed malo-lactic fermentation considerably faster than identical wines inoculated with ML-34. In the other var., wines inoculated with either organism completed malo-lactic fermentation at about the same time which was much faster than the uninoculated control lots. Sensory evaluation of the varietal wines treated identically, except for the bacterial strain inoculated, revealed that no detectable differences existed in the wines. AS

27

[Influence of nitrogen components of wine on the growth of lactic bacteria.]
Feuillat, M.
Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences, D 285 (9) 1013–1016 (1977) [9 ref. Fr, en] [Lab. d'Oenologie, Fac. des Sci., PO Box 347, 51062 Reims, France]

3 different fractions of N compounds were extracted from wine, viz. proteins, peptides, and amino acids. They were tested as supports for the growth of malolactic bacteria in acid medium; only the peptidic fraction supported this growth. AS

28

Effects of spices on the growth of lactic acid bacteria.
Yoo, J.-Y.; Min, B.-Y.; Suh, K.-B.; Hah, D.-M.
Korean Journal of Food Science and Techn ology 10 (2) 124–135 (1978) [35 ref. En, ko] [Food Res. Inst., Agric. & Fishery Development Corp., Seoul, S. Korea]

Effects of different amounts of red pepper, garlic or ginger extract on growth of lactic acid bacteria in Kimchi were studied. Cultures of Lactobacillus plantarum ATCC 801A and L. fermenti ATCC 9338 were inoculated on lactobacilli MRS broth (as a control) and on broth containing 0.1, 0.5, or 2.0 ml of garlic, red pepper or ginger extract. Samples were incubated at 25° C for 3 days. Analysis of the effect of the extracts on growth of L. plantarum ATCC 8014 and L. fermenti ATCC 9338 given in graphs show that in general addition of 0.1 ml extract had no significant effect on growth over the control, however growth was stimulated as amount of extract added increased. Acid production tended to decrease in L. plantarum ATCC 8014 as pH increased with increased incubation time. However as pH fell with increased incubation, acid production increased in L. fermenti ATCC 9338. It was concluded that there were no distinct differences in growth stimulating effect between ginger, garlic or red pepper extract. SP

29

[Application of amylolytic lactic acid bacteria to prevent ropiness of bread.]
Goncharov, M. D.; Sokolov, P. I.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 3, 32–34 (1977) [Ru] [Inst. Mikrobiol. i Virusologii AN Kazakhskoi SSR, USSR]

When incorporated into bread dough, Streptococcus lactis diastaticus hydrolyses some of the starch to lactic acid which increases the dough acidity. The resulting bread is resistant to the development of rope and has an improved porosity, aroma and crumb consistency. STI

30

[Some observations on inhibition of lactic acid fermentation under industrial conditions.]
Popovic-Vranjes, A.
Mljekarstvo 28 (1) 5-12 (1978) [Sh, en] [RO Mljekarska Ind., Banja Luka, Yugoslavia]

Samples of milk delivered to the Novi Sad (Yugoslavia) dairy factory during March–June [? 1977] by private and state farms were examined in the factory's laboratory for suitability for cultured milk production by heating at 95° C for 5 min, cooling to 43° C, addition of 2% pure yoghurt culture and incubation for 3 h. Of the total of 199 586 l. of milk samples, 101 941 l. were judged to show defective fermentation (titratable acidity <20° SH), the incidence of the fault being 67.1, 12.9, 11.9 and 8.3% in March, April, May and June, resp. It is concluded from microscopic examination of the incubated samples that defective fermentation was connected with morphological changes in Lactobacillus bulgaricus and Streptococcus thermophilus, the changes being ascribed to effects of milk produced by cows given mouldy silage or treated with antibiotics. SKK

31

[Thermoduric streptococci in raw milk consumed in Santa Maria, R.S.]
Brum, M. A. R. de; Pieniz, L. C.; Silva, L. H. V. da; Shclabitz, J. C.
Revista do Centro de Ciencias Rurais 7 (1) 33-35 (1977) [8 ref. Pt, en] [Dep. de Tecnologia Alimentar, Univ. Fed. Santa Maria, Brazil]

30 samples of commercial raw milk from Santa Maria were examined after laboratory pasteurization. 2 of the samples showed Gram-positive colonies of thermoduric streptococci on bromocresol purple/azide agar. The 2 isolates were identified as Streptococcus faecalis by tests including incubation on TTC agar. JMD

32

[Preparation of cheese-like product using soybean milk.]
Yu, J.-H.; Shin, W.-C.; Pyun, Y.-R.; Yang, R.
Korean Journal of Food Science and Technology 10 (2) 231-236 (1978) [20 ref. Ko, en] [Dep. of Food Eng., Coll. of Eng., Yonsei Univ., Seoul, S. Korea]

The preparation of a cheese-like product from defatted soybean milk and changes occuring during 6 wk ripening were studied. Defatted soybean milk was fermented at 37° C for 4 h with Streptococcus lactis YUFE L-4 without addition of any other C sources. Optimum concn. of coagulant such as $MgCl_2.6H_2O$ and $CaCl_2$ were 0.0125M and 0.0375M, resp. Coagulating for 30 min was sufficient to give a curd. Optimal reaction temp. for coagulating was 50° C. After 6 wk ripening, moisture content was approx. 62–63%. Water- and 10% trichloroacetic acid (TCA)-soluble N contents of soybean cheese with Aspergillus saitoi protease were higher than those of Mucor rennet. Water-soluble N content of A. saitoi protease cheese was 50.5%, and 10%-TCA soluble N was 27.5%. AS

33

[Technological measurements for determining the reaction heat in fermenting whey with a mixed culture of Lactobacillus bulgaricus and Saccharomyces cerevisiae in a 20 m^3 fermenter plant.] Verfahrenstechnische Messungen zur Ermittlung der Reaktionswärme bei der Verhefung von Molke mit einer Mischkultur von Lactobacillus bulgaricus und Saccharomyces cerevisiae in einer 20-m^3-Fermenteranlage.
Grasshoff, A.; Reuter, H.
Kieler Milchwirtschaftliche Forschungsberichte 30 (2) 189-195 (1978) [2 ref. De, en, fr] [Inst. für Verfahrenstech., Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

The heat evolved during fermentation is measured as the product of quantity and change of temp. of the refrigerating water, controlled circulation of which maintains the temp. of the fermenting whey at approx. 37° C. The heat of reaction thus obtained is corrected for the heat contributions of the steam injected (required mainly to raise the whey initially to 37° C) and the stirring, foam breaking and aeration system. Average results of 4 experiments were 9.0 (6.75–11.25) MJ/kg substrate carbohydrate fermented, and 18.0 (16.14–23.03) MJ/kg newly formed cell dry matter. These values are, unaccountably, about twice as great as those recorded in the literature. GTP

34

[Determination of oxygen demand in production of yeast from whey using a mixed culture of Lactobacillus bulgaricus and Saccharomyces cerevisiae.] Messungen zum Sauerstoffbedarf bei der Verhefung von Molke mit einer Mischkultur von Lactobacillus bulgaricus und Saccharomyces cerevisiae.
Grasshoff, A.; Reuter, H.
Milchwissenschaft 33 (6) 359–363 (1978) [6 ref. De, en, fr, es] [Inst. für Verfahrenstech., Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

The following pilot-plant yeast production method was chosen from the methods for yeast production from whey described and discussed in FSTA (1976) 8 10G692 & 10P1801: 7000 kg whey, 40 kg yeast autolysate (produced from 20 kg pressed yeast of 25% DM and 20 kg $(NH_4)_2SO_4$ by holding for 24 h at 48° C), 40 kg yoghurt culture and 50 kg baker's yeast were incubated at 37° C under aeration (216 m^3/h) in the 20-m^3 fermenter. After completion of the 1st growth period, half of the fermenter contents were removed and replaced by 20 kg yeast autolysate and enough fresh whey to restore the contents to 7000 kg. The whole cycle lasted usually 6–7 h, with a biomass DM output of 2% of the charge. The biochemical aspects of the fermentation process are discussed with particular reference to O_2 uptake, which was followed by measurements of O_2 content of exhaust air using a Taylor-Servomex Oxygen Analyzer type OA 250. It is concluded from tabulated and graphically presented data that the O_2 uptake was on average 2.12 kg/kg newly formed biomass DM vs. the literature value of 0.76 kg. The authors were as yet unable to put forward an explanation of this marked discrepancy. SKK

35

Fractionation and properties of a peptidase of Streptococcus cremoris which decomposes chymosin-treated α_{s1}-casein. [Lecture]
Yamauchi, K.; Kaminogawa, S.; Hwang, I. K.
International Congress of Food Science & Technology - Abstracts p.173 (1978) [En] [Dep. of Agric. Chem., Univ. of Tokyo, Bunkyo-ku, Tokyo 113, Japan]

Purified peptidase from Str. cremoris H-61 showed optimum activity at pH 6.5 on chymosin-treated α_{s1}-casein and on Leu-Gly dipeptide. Activity was inhibited completely by Hg^{2+} and Cu^{2+} and partially by Mn^{2+} and Fe^{2+}. The enzyme appeared to be an aminopeptidase. [See FSTA (1979) 11 2A60.] CDP

36

The effect of aflatoxin B_1 on the morphological and biochemical properties of lactic acid bacteria for yoghurt manufacturing. [Lecture]
Sutic, M.; Banina, A.
International Congress of Food Science & Technology - Abstracts p.270 (1978) [En] [Fac. of Agric., Univ. of Belgrade, Belgrade-Zemun, Yugoslavia]

Presence of aflatoxin B_1 produced 5- to 8-fold increase in cell length of Lactobacillus bulgaricus, formation of long chains ($\geq$27 cells) of Streptococcus thermophilus, and a delay of 30–90 min in the clotting time of milk by a mixture of these 2 organisms. [See FSTA (1979) 11 2A60.] CDP

37

Lactobacilli isolated from French saucisson (taxonomic study).
Laban, P.; Favre, C.; Ramet, F.; Larpent, J. P.
Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, IB 166 (1) 105–111 (1978) [13 ref. En, de] [Lab. de Recherche API, La Balme des Grottes, F-38390 Montalieu-Vercieu, France]

Numerical taxonomy studies were conducted on 190 strains of lactobacilli isolated from French 'saucisson' sausages; 50 biochemical tests were conducted, using the API 50 L system (manufactured by API System S.A. La Balme des Grottes, 38390 Montalieu-Vercieu, France). 6 representative taxa were established; these differed considerably from those of lactobacilli of dairy origin. The advantage of use of these sausage-specific lactobacilli (rather than dairy-type strains) as starters in saucisson manufacture is briefly discussed. AJDW

38

[Effect of maize extract and fodder yeast autolysate on biomass yield of lactic acid bacteria.]
Dilanyan, Z. Kh.; Ter-Kazar'yan, S. Sh.; Ayunts, K. M.; Vegapetyan, K. V.
Molochnaya Promyshlennost' No. 8, 10–12 (1978) [10 ref. Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

Nutrient media consisting of whey and salts with (i) 10% hydrolysed milk and 1% autolysed baker's yeast (AB) or (ii) 2% maize extract (ME) and 1% AB, or (iii) 1% ME and 2% AB, or (iv) 2% ME, or (v) 2% ME and 2% AB, or (vi) 2% ME and 1% autolysed fodder yeast (AF), or (vii) 2% ME and 2% AF, or (viii) 1% ME and 2% FE were inoculated with 1% of a mixed culture of 2 strains of Lactobacillus plantarum, 2 of L. lactis, 2 of Streptococcus faecalis, and 1 of Str. thermophilus (ratio of lactobacilli to streptococci, 1:2). Culturing was at 40° C for 24 h. Mean cell yields for (i)–(viii) resp. were (millions of cells/ml): 114, 469, 579, 322, 656, 528, 599 and 583. SKK

39

Dialysis continuous fermentation process for production of metabolites and cells: model and tests of dialysate-feed system.
Stieber, R. W.; Gerhardt, P.
Abstracts of Papers, American Chemical Society 176, MICR 7 (1978) [En] [Dep. of Microbiol., Michigan State Univ., E. Lansing, Michigan 48824, USA]

A generalized mathematical model, previously developed and experimentally validated, was used to computer-simulate the use of a dialysate-feed system to operate a dialysis continuous fermentation process. The fermentation of lactose to lactic acid by Lactobacillus bulgaricus, with neutralization to constant pH by NH_3, was used as an example. Simulations predicted that the feeding of substrate directly into the dialysate and thereby via dialysis into the fermentor would greatly improve a continuous process for production of cell mass and cell-free metabolite. The cell-mass concn. in the fermentor could be increased to a max. limited only by osmotic dilution by water from the dialysate. A pure culture could be maintained without sterilizing or pasteurizing the substrate. Experimental tests validated the theoretical predictions. AS

40

Activity of the freeze dried Streptococcus lactis subsp diacetylactis DRC_1 in gelatin capsules and strip packed tablets during storage.
Lal, M.; Tiwari, M. P.; Sinha, R. N.; Ranganathan, B.
Egyptian Journal of Dairy Science 6 (1) 33–37 (1978) [9 ref. En, ar] [Nat. Dairy Res. Inst., Karnal, Haryana, India]

Freeze-dried, neutralized 18-h skim-milk culture of S. lactis subsp. diacetylactis DRC_1 retained activity for >90 days when filled into gelatin capsules and stored at 5° C. Control freeze-dried culture (in sterile glass bottle) showed no activity after 60 days at 5° C, and that compounded with calcium triphosphate into tablet form and strip-packaged in cellophane showed no activity after 45 days. Marked reduction in activity of the culture stored in gelatin capsules was noted with increase in storage temp. from –20° to +37° C. CDP

41

Effect of storage on the behaviour of some freeze-dried lactic-acid cultures variously treated.
Naghmoush, M. R.; Girgis, E. S.; Guirguis, A. H.; Fahmi A. H.
Egyptian Journal of Dairy Science 6 (1) 39–47 (1978) [10 ref. En, ar] [Food Sci. Dep., Cairo Univ., Cairo, Egypt]

Single strain cultures of Streptococcus lactis, S. thermophilus and Lactobacillus bulgaricus in sterile 10% reconstituted dried skim-milk containing various

additives and buffered to pH 6.9 or neutralized with marble, were freeze-dried by a modified procedure and stored in sealed ampoules at room temp. Total cell and viable counts of all 3 organisms decreased throughout the 6-month storage period, magnitude of the decline varying with organism and treatment. However, all cultures retained 'excellent' activity, even at the end of the storage period; treatments particularly good for preserving culture activity were addition of yeast extract, vitamin E, or buffering to pH 6.9 for S. lactis, and addition of yeast extract, Tween 80, sheep's serum or buffering to pH 6.9 for L. bulgaricus. CDP

42

[Streptococcus lactis strain TIS-220 - a test culture for detecting virulent and moderately active bacteriophages of mesophilic lactic streptococci.]
Bannikova, L. A.; Mytnik, L. G.; Zadoyana, S. B. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 600 179 (1978) [Ru]

Cells of S. lactis strain TIS-220, held in the collection of the All-Union Milk Industry Research Institute, measure 0.8–1.1 μm and are present as cocci, diplococci or chains of 4–6 cells. 48-h colonies in hydrolysed milk agar are white with smooth edges and 1–2 mm in diam., while in a similar medium containing chalk and bromcresol purple they are slightly dull with zones and 1.8–4.0 mm in diam. The strain sours milk in 6–7 h with formation of dense curd, the optimum temp. being 28–30° C. The strain ferments arabinose, lactose, fructose, galactose, maltose, glucose and dextrin, but not raffinose, mannitol or sorbitol. Acid formation limit is 120° T. The strain forms volatile acidity equivalent to 0.9 ml 0.1N NaOH, and a small amount of C4 compounds. Proteolytic activity is 6.5 mg% tyrosine and arginine is fermented with production of ammonia. The strain is highly sensitive to virulent and moderately active phages and 100% of cells are sensitive. W&Co

43

Role of acetaldehyde in metabolism: a review. I. Enzymes catalyzing reactions involving acetaldehyde. [Review]
Lees, G. J.; Jago, G. R.
Journal of Dairy Science 61 (9) 1205–1215 (1978) [135 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne, Parkville, Victoria 3052, Australia]

While acetaldehyde appears to be a metabolite in most organisms, bacteria, in particular, possess the most diverse pathways for the metabolism of this compound. Acetaldehyde is involved in the metabolism of carbohydrate, protein, lipid, nucleic acid, and aromatic compounds and thus provides a mechanism for the interchange of carbon atoms between these compounds. The enzymes metabolizing acetaldehyde are discussed with reference to enzyme systems in bacteria [including lactic acid bacteria] and their role in the overall metabolism of the organisms. [See following abstr. for part II.] AS

44

[Symbiosis in yoghurt culture. I. Isolation and identification of a growth factor for Streptococcus thermophilus produced by Lactobacillus bulgaricus.]
Higashio, K.; Yoshioka, Y.; Kikuchi, T.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] 51 (4) 203–208 (1977) [7 ref. Ja, en] [Tech. Res. Inst., Snow Brand Milk Products Co. Ltd., Kawagoe, Saitama, Japan]

In symbiotic culture in milk, certain amino acids produced by Lactobacillus bulgaricus stimulated the growth of Streptococcus thermophilus; these were identified as valine, histidine, methionine, glutamic acid and leucine. Omission of single amino acids from the mixture showed that valine was the most effective in stimulating acid production by S. thermophilus. Individual amino acids had no such stimulating effect; only the mixture accelerated acid production. [From En summ.] JRR

45

[Symbiosis in yoghurt culture. II. Isolation and identification of a growth factor for Lactobacillus bulgaricus produced by Streptococcus thermophilus.]
Higashio, K.; Yoshioka, Y.; Kikuchi, T.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] 51 (4) 209–215 (1977) [8 ref. Ja, en] [Tech. Res. Inst., Snow Brand Milk Products Co. Ltd., Kawagoe, Saitama, Japan]

Substances elaborated by Streptococcus thermophilus which stimulated the growth of Lactobacillus bulgaricus in symbiotic culture were identified as formic and pyruvic acids. These acids showed a synergistic effect on stimulation of acid production and growth of all strains of L. bulgaricus used in the study. In the synergistic combination, formic acid was irreplaceable, but pyruvic acid could be substituted with oxaloacetic, fumaric, L-malic and α-ketoglutaric acids. The stimulating effect on acid production of oxaloacetic and fumaric acids was nearly equal to that of pyruvic acid. [From En summ.] JRR

46

Stabilization of lactose metabolism in Streptococcus lactis C2.
McKay, L. L.; Baldwin, K. A.
Applied and Environmental Microbiology 36 (2) 360–367 (1978) [21 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St Paul, Minnesota 55108 USA]

Phage lysates induced from S. lactis C2 were used to transduce lactose-fermenting ability (Lac^+) to the lactose$^-$ and proteinase-negative (Lac^-Prt^-) strain LM0220. When 60 of the resulting transductants were induced, and the resulting lysates tested for ability to transfer Lac^+, 4 of the transductants (KB18, KB21, KB54 and KB58) yielded lysates which failed to do this. In contrast to the parent strain and other Lac^+ transductants, neither growth under continuous culture conditions nor successive subculturing in the presence of acriflavin produced any Lac^- revertants from these 4. Agarose gel electrophoresis of the DNA, and the effect of UV irradiation or Lac^+ transducing ability, suggested

that the lactose plasmid had become integrated into the bacterial chromosome. Strain KB21 had also become stabilized for the Prt^+ character, with about half of the proteinase activity of the parent strain. Strain KB21 is currently being tested in cheesemaking trials; it is hoped that it will be less prone than S. lactis C2 to produce bitter Cheddar cheese owing to the lower proteinase activity, in addition to its other useful properties. JDr

47

Influences of temperature on growth of Leuconostoc cremoris.
Cooper, R. K.; Collins, E. B.
Journal of Dairy Science 61 (8) 1085–1088 (1978) [13 ref. En] [Dep. of Food Sci. and Tech., Univ. of California, Davis, California 95616, USA]

Optimal growth temp. in citrate broth for 6 strains of L. cremoris varied from 24° to 27° C and averaged 26° C. The average generation time at 26° C was 3.2 h. Min. and max. growth temp. were 14–17° and 34–36° C, resp. Comparison of the data for L. cremoris with that previously obtained for Streptococcus cremoris suggests that 22–25° C is the appropriate temp. range for propagating dairy cultures containing lactic streptococci and L. cremoris. Molar growth yields and values for end products produced [ethanol and lactate] in citrate broth (with citrate and acetate omitted) were excessively high because energy was gained and end products were produced from constituents of the complex medium other than added glucose. AS

48

[Nutritional and physiological aspects of L(+) and D(−) lactic acid.] Ernährungsphysiologische Gesichtspunkte der L(+)- und D(−)-Milchsäure.
Krusch, U.
Kieler Milchwirtschaftliche Forschungsberichte 30 (3) 341–346 (1978) [13 ref. De, en, fr] [Inst. für Mikrobiologie der Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

This review-type article gives data on the characteristics of lactic acid, metabolism of lactic acid, L- and D-lactic acid in the metabolism in mammals, and on the contents of lactic acid (total and L-) in various milk products. It is concluded that continuous daily intake of almost 1 l. fermented milk products (yoghurt) is absolutely safe in a normal diet. FL

49

The effect of host-controlled modification on the replication rate of a lactic streptococcal bacteriophage.
Pearce, L. E.
New Zealand Journal of Dairy Science and Technology 13 (3) 166–171 (1978) [17 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

A virulent bacteriophage (phage), 643 of Streptococcus lactis ML_3, showed a classical pattern of host-controlled restriction and modification when propagated on Str. cremoris KH. The restriction with strain KH was substantially removed by heating starved cells to 40° C. Similar heat treatment had no effect on KH cells growing in milk. Phage 643 was also restricted and modified by Str. cremoris US_3. The latent period of phage 643 was independent of the host specificity. Burst sizes on the modifying hosts were reduced and adsorption was less efficient than to strain ML_3. Low infectivity due to poorer adsorption appears to be the most important factor contributing to the very slow replication rates of these modified phages. The results suggest that while phage modifications between Str. lactis and Str. cremoris hosts can be obtained readily under laboratory conditions, the progeny phages would normally replicate only slowly. In the absence of further changes, such modifications are unlikely to become established in the commercial cheesemaking environment. AS

50

[Resistance to copper of lactic acid bacteria used in cheese starters.]
Kolodkin, A. M.
Prumysl Potravin 29 (8) 459–460, 462 (1978) [6 ref. Sk] [Gosudarstvennyi Univ. A. A. Zhdanova, Irkutsk, USSR]

Results are reported of long-term studies on the effects of Cu on lactic acid bacteria, cheese starters and biochemical processes during cheese ripening, using Streptococcus lactis 5c-1, Str. lactis 3M-1, Str. acetoinicus 338, Lactobacillus helveticus 303, L. lactis 367s and L. plantarum 28. The initial Cu content of the milk (0.18–0.36 mg/kg) was increased to the desired levels by the addition of $CuSO_4$. The data obtained with additions of 0.1–3.0 mg Cu/kg milk concerning the multiplication of the individual strains on incubation for 72 h in milk and the development of pH, titratable acidity and concn. of volatile acids are tabulated. Cu conc. of ≤ 1.0 mg/kg had favourable effects on the growth of starters for the manufacture of low-temp. scalded cheese varieties, whilst Cu concn. of > 2.0 mg/kg were inhibitory. In Pyatigorskii cheese manufacture using starters with L. helveticus 303, Cu addition at 1.5 mg/kg was optimum for the production of volatile acids and protein breakdown; after ripening for 15 days, the cheese contained about 30% more free amino acids than the control. Cu addition to milk, apart from its effect on the biochemical activity of the lactic acid bacteria, also caused morphological changes, e.g. formation of chains or clusters in mono- and diplococci and 5–6 fold elongation of rods in lactobacilli. FL

51

A method for manufacturing lactic acid fermented milk beverages.
Mutai, M.; Aso, K.; Kamiyama, K.; Yanagisawa, T.; Katayama, Y.; Onoue, M. (Yakult Honsha Co. Ltd.)
British Patent 1 512 890 (1978) [En]

A lactic acid beverage is produced by fermenting a medium comprising milk using Lactobacillus helveticus YIT-0100 (FERM – P No. 2946) or L. helveticus YIT-0019 (FERM – P No. 3083) preferably together with a low-acid producing acid-resistant bacillus, e.g. L. casei PS – 1 (FERM – P 1766). L. acidophilus may also be used. According to 1 of 4 examples, the product is incubated for 40 h to an acidity of 2.75 and homogenized, and sugar syrup, flavourings and fruit juices are added to prepare a liquid base for lactic acid

beverages containing viable bacteria. The base is diluted with 1.5 vol. of sterile water to manufacture a beverage for drinking. FL

52

[Bacteriological problems with additives used in dry sausage manufacture.]
France, Universite de Clermont-Ferrand, Laboratoire de Microbiologie
RTVA 15 (119) 38 (1976) [Fr]

The bacteriological quality of 3 commercial lactic starter cultures for dry sausage manufacture was studied. Only 1 of the 3 was free from undesirable organisms. Of the other 2, one contained faecal streptococci at a count of 1.6×10^6/g; the other contained faecal streptococci at a count of 1.1×10^7/g, staphylococci at 5.2×10^7/g, and coliforms at 5×10^3/g. None contained sulphite-reducing clostridia. 3 batches of unspecified chemical additives were also studied. Total mesophilic counts were 3.7×10^3/g, 3×10^2/g and 10/g. Counts of faecal streptococci were <10/g in all samples. No lactobacilli, non-faecal streptococci, staphylococci or coliforms were detected in any of the 3 samples. AJDW

53

Freeze injury in Lactobacillus acidophilus.
Johnson, M.; Speck, M. L.; Ray, B.
Abstracts of the Annual Meeting of the American Society for Microbiology 78, 190 (1978) [En]
[N. Carolina State Univ., Raleigh, N. Carolina, USA]

Conc. cell suspensions of Lactobacillus acidophilus NCFM prepared from cells grown in 10% milk SNF (MSNF) were frozen in 2 ml quantities at −196° C, −76° C, and −20° C. After storage, the surviving cells were found to have an increased susceptibility to oxgall (bile salts). The amount of injury was related to the temp. of freezing and the duration of storage. The cells frozen at −10° C showed the most injury. Repair, or the ability of injured cells to regain their ability to form colonies on oxgall agar, was observed within 60 min at 37° C and 20° C by resuspending the cells in 10% MSNF or Lactobacillus selective (LBS) broth. The rate of repair was greater in LBS broth than in 10% MSNF. Repair did not occur at 5° C during storage for 5 days. Repair of injured cells occurred in 10% MSNF (pH 5.0) at 37° C, but not at pH 4.0. At pH 4.0, only the injured cells failed to survive. At pH 3.0, both injured and uninjured cells lost viability. Metabolic processes involved in the repair of injured cells are being studied with the use of inhibitors specific for the synthesis of macromolecules. AS

54

Variation of combined heat-irradiation effects on cell inactivation in different types of vegetative bacteria.
(In 'Food preservation by irradiation' [see FSTA (1979) 11 4G311]) [Lecture]
Okazawa, Y.; Matsuyama, A.
I, 251–262 (1978) [10 ref. En] [Inst. of Physical & Chem. Res., Wako-shi, Saitama-ken, Japan]

Combined effects of irradiation and heating on cell inactivation were studied with E. coli K-12 derivatives of different DNA repair capacities and some thermophilic bacteria. With E. coli K-12 mutants log-phase cells of all 4 strains tested were sensitized to radiation by simultaneous heating. Simultaneous heating was more effective for radiosensitization than heating before or after irradiation. This combination effect was not or only weakly observed with stationary-phase cells. From recovery experiments and sedimentation analysis of DNA from E. coli cells the process of the synergistic interaction may involve the inhibition of the recovery from heat damage and the DNA repair, especially Type II repair. In respect of thermophilic bacteria, it was found that Streptococcus thermophilus becomes more sensitive to radiation under the combined treatment with heating, while other thermophilic strains do not, according to a comparison of the radiosensitivities in terms of the D_{10} (decimal reduction) value of the exponential slopes of the survival curves. The latter observation with thermophilic bacteria is in contrast to E. coli. The results of sedimentation analysis of DNA of thermophiles gave unique features. AS

55

Toxicological model for a two-acid system.
Rubin, H. E.
Applied and Environmental Microbiology 36 (4) 623–624 (1978) [7 ref. En] [Dep. of Environmental & Ind. Health, School of Public Health, Univ. of Michigan, Ann Arbor, Michigan 48109, USA]

Lactic and acetic acids were determined to be slightly synergistic in their inhibitory interrelationship against Salmonella typhimurium with the use of a modified toxicological model. AS

56

Natto-containing bacteria.
Naruse, K.; Naruse, W. (Naruse Fermentation Laboratories Co. Ltd.)
United States Patent 4 110 477 (1978) [En]

A method is described for producing natto containing lactic acid bacteria, which comprises growing Bacillus natto and lactic acid bacteria on steamed soybeans in the presence of a nutritive medium containing a homogenized aqueous mushroom suspension. As compared with B. natto grown alone on soybean, the fermented food lacks objectionable off flavours or an ammonia odour, and the product keeps its quality unchanged for a longer period. SP

57

Medium for Lactobacillus and Pediococcus.
Woodward, J. D.
Journal of the Institute of Brewing 84 (5) 293 (1978) [7 ref. En]

6 nutrient agar media were compared for growth (number of colonies and colony diam.) of 5 lactobacilli strains and 2 spp. of Pediococcus. On the basis of the results, the Microbiology Sub-Committee of the Analysis Committee of the Institute of Brewing (UK) has recommended sucrose agar (details of composition and preparation are given) for routine detection of lactobacilli and pediococci in brewery samples. DIH

58

[Microbiology of lactic cultures. VII. Fermentation of malic acid and tartaric acid.] [Review]
Bottazzi, V.
Scienza e Tecnica Lattiero-Casearia 29 (3) 197–205 (1978) [28 ref. It] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica del Sacro Cuore, Piacenza, Italy]

This sequel to the series of reviews on dairy starters [see FSTA (1978) 10 8P1187–1190] examines the following types of fermentation which occur in wine: conversion of malic acid to lactic acid and CO_2 by Lactobacillus plantarum, L. brevis, Leuconostoc oenos, Leuc. dextranicum, Leuc. oinos [?] and certain other spp.; and breakdown of tartaric acid by Pediococcus, Leuconostoc and Lactobacillus spp. The fermentation of tartaric acid by L. plantarum leads via oxalacetic acid and pyruvic acid to lactic acid and acetic acid + CO_2, whereas the fermentation by L. brevis follows a different pattern, ending with pyruvic acid and acetic acid + CO_2. Details are given of media for the isolation of bacteria fermenting malic acid; the resultant μ(+)lactic acid may be determined with lactate dehydrogenase by the method of Bergmeyer [Methods of enzymatic analysis (1963) New York, Academic Press]. ADL

59

[Composition of saccharides in lactose molasses.]
Krol, B.
Przemysl Fermentacyjny i Owocowo-Warzywny 22 (4) 27–28 (1978) [10 ref. Pl, ru, en] [Inst. Chem. Tech. i Zywnosci, Politech., Lodz, Poland]

Qualitative and quantitative analyses were made of sugars in selected samples of lactose molasses. The qualitative analysis was performed by paper chromatography in an n-propanol/ethyl acetate/water system. The aldoses were determined by means of the aniline reagent; the ketoses were studied with the resorcinol reagent. Quantitative analysis was performed by the Date/Roe method. The lactose molasses were found to contain 5 sugars (lactose residue, lactulose, galactose, glucose and lacto-N-tetrose). The sugars constitute about 47% of lactose molasses DM; the lactose is about 37%, and the total of lactulose, galactose and glucose is about 10%. The lactulose was found to stimulate bacterial growth (e.g. Lactobacillus bifidus), and the activity of proteolytic bacteria (e.g. L. casei). STI

60

[The microflora of sour dough. IV. Types of rod-shaped lactic acid bacteria (genus Lactobacillus Beijerinck) found in 'pure culture' starters.] Die Mikroflora des Sauerteiges. IV. Untersuchungen über die Art der in 'Reinzuchtsauern' anzutreffenden stäbchenförmigen Milchsäurebakterien (Genus Lactobacillus Beijerinck).
Spicher, G.; Schröder, R.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 167 (5) 342–354 (1978) [17 ref. De, en] [Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Schützenberg 12, D-4930 Detmold 1, Federal Republik of Germany]

The bacterial composition of 3 'pure culture' sour dough starters of varying origin was investigated. 245 isolates were obtained all belonging to the genus Lactobacillus Beijerinck. According to their morphological, physiological and biochemical characteristics they were classified into the subgroups: Thermobacterium (L. acidophilus), Streptobacterium (L. casei, L. plantarum, L. farciminis, L. alimentarius) and Betabacterium (L. brevis, L. brevis var. lindneri, L. buchneri, L. fermentum, L. fructivorans). In the 3 sour dough starters the identified lactic organisms varied in number and proportion. In starter preparation A, only the spp. L. fructivorans and L. fermentum were present. Preparation B contained a great variety of microorganisms with L. brevis and L. brevis var. lindneri predominating. In starter C, L. brevis, L. plantarum and L. alimentarius predominated. [See Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene II (1966) 120 685–702 for part III.] AS

61

[Rapid identification of bread made from sour dough or with the aid of chemical souring agents.] Zur raschen Erkennung von mit Sauerteig oder Teigsäuerungsmitteln gebackenen Broten.
Thaler, H.
Deutsche Lebensmittel-Rundschau 74 (10) 361–373 (1978) [5 ref. De, en, fr] [Inst. für Lebensmittelchem., Tech. Univ., Braunschweig, Federal Republic of Germany]

A microscopic method for differentiation between sour dough bread made with a lactic starter and that made with chemical souring agents is described, based on selective staining of the lactic acid bacteria. A sample of ≤10 g bread is briefly soaked in water, then finely comminuted. 5 ml of the resulting dispersion are mixed with approx. 0.5 ml (15 drops) of Löfflers methylene blue stain. A few drops of the stained dispersion are then examined microscopically for lactic acid bacteria. AJDW

62

Strains of Streptococcus lactis which contain β-galactosidase.
Farrow, J. A. E.; Garvie, E. I.
Journal of Dairy Research 46 (1) 121–125 (1979) [14 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

63

Dialysis continuous fermentation process for converting deproteinized whey into ammonium lactate and bacterial cells.
Stieber, R. W.; Gerhardt, P.
Abstracts of the Annual Meeting of the American Society for Microbiology 78, 186 (1978) [En] [Michigan State Univ., East Lansing, Michigan 48824, USA]

A mathematical model was developed, simulations were made by computer, and laboratory experiments were conducted on a dialysis continuous process for the fermentation of deproteinized cheese-whey lactose to ammonium lactate and bacterial cells. The fermenter

contents were poised at a constant pH by adding NH_3 solution and were dialysed through a membrane against water. The dried whey was rehydrated to contain 242 mg lactose/ml, supplemented with 8 mg yeast extract/ml, charged into a 5-l. fermenter without sterilization, adjusted in pH (5.5) and temp. (44° C), and inoculated with Lactobacillus bulgaricus. The fermenter and dialysate circuits were connected and a series of steady-state conditions was managed non-aseptically for 71 days. The results agreed with the theoretical predictions. The optimal rates of fermentation and dialysis depended on whether the process was maximized for ammonium lactate production, cell production, or substrate utilization. The rate of converting lactose to products was lower for deproteinized than normal whey. The process was more efficient than non-dialysis batch and continuous processes for the ammonium lactate fermentation. AS

64

[Streptococcus diacetilactis strain 6a/14, used in inocula for margarine, soured cream butter and curds.]

Shmeleva, L. I.; Fal'k, E. Yu.; Shamraeva, N. D.; Grinevich, A. G.; Sidorova, I. N.; Berezovskaya, A. A. **(Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Zhirov)

USSR Patent 605 834 (1978) [Ru]

The culture, stored in the collection of the All-Union Fats Research Institute, is a Gram-positive diplococcus, growing in short chains of 4–6 cocci and with a diam. of 0.5–0.6 µm. Active deep and surface growth is obtained in hydrolysed milk agar, while in the same medium with 1% calcium citrate and 1% yeast autolysate, deep and surface colonies give 0.5–0.8 cm clear zones. Growth in meat-peptone broth with glucose gives uniform turbidity. The strain reduces and coagulates litmus milk and milk with 0.1–0.3% methylene blue. Gelatin is not liquefied, and the strain does not grow in broth at pH 9 6 containing 6.5% NaCl. Ammonia is formed from arginine. Glucose, galactose, lactose, maltose, sucrose, fructose, xylose, arabinose, raffinose, rhamnose and dextrin are fermented, and dulcitol, sorbitol, mannitol and glycerin are utilized. The strain is resistant to specific bacteriophage. Milk is soured in 6–9 h with formation of diacetyl and acetaldehyde in an optimal ratio of 3:1. W&Co

65

Taxonomic relationships between Streptococcus thermophilus and some other streptococci.

Ottogalli, G.; Galli, A.; Dellaglio, F.

Journal of Dairy Research 46 (1) 127–131 (1979) [11 ref. En] [Istituto di Microbiol. Agraria, Univ., Milan, Italy]

Results of physiological, biochemical and serological tests on streptococcal strains isolated from cheese and yoghurt, and culture collection strains of Str. thermophilus, Str. bovis, Str. faecalis, Str. faecium, Str. durans, Str. equinus and Str. lactis showed that all strains from Swiss, Italian and Dutch yoghurts and from Crescenza, Italico and Mozzarella cheeses were classified as Str. thermophilus. Crescenza and Italico cheese starters contained Str. faecium, Str. bovis and Str. faecalis, indicating that the presence of enterococci in dairy products is not necessarily an indication of faecal contamination. The % DNA homology among the streptococcal spp. was determined, and it is concluded that the use of DNA hybridization provides a useful method for clarifying the taxonomy of unknown streptococcal strains. MEG

66

[Lactobacillus mazuni strain No. 2 'Karine', used for manufacture of a medicinal-dietetic cultured milk product.]

Erzinkyan, L. A.; Pakhlevanyan, M. Sh.; Charyan, L. M.; Akopyan, L. G.; Vekilyan, S. M. **(Union of Soviet Socialist Republics,** Institut Mikrobiologii AN Armyanskoi SSR)

USSR Patent 590 335 (1978) [Ru]

The strain comprises Gram-positive, non-motile homofermentative rods measuring (4–38) × 0.9 µm, predominantly non-granular. Growth occurs in liquid media, including meat-peptone broth with 1% glucose or lactose, hydrolysed milk, whey and similar media containing agar. On addition of 3% culture, milk is soured in 6 h at an optimal temp. of 36° C, with a max. acid formation of 400° T. The strain retains its capacity for growth in milk containing up to 0.1 IU penicillin and streptomycin/ml, 1.1% phthalazole, 0.3% phenol and 3.0% NaCl. Glucose, maltose, fructose and lactose are fermented, and arabinose, dextrin, xylose, salicin, sorbitol and mannose weakly fermented. Volatile acids, 0.14 mg% diacetyl and 4 mg% acetoin are formed in milk, in which the contents of riboflavin and thiamin are increased by 16% and 153%, and the ascorbic acid content is doubled. Proteolytic activity related to accumulation of tyrosine is 1.4×10^{-4} Ansen units. The strain exhibits high anti-microbial activity. W&Co

67

Influence of UV-rays and nitrosoguanidine on the proteolytic activity of Lactobacilius casei.

Piatkiewicz, A.; Oberman, H.

Acta Alimentaria Polonica 4 (2) 217–228 (1978) [25 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiologii, Politech., Lodz, Poland]

A suspension of L. casei cells was exposed to UV-rays and to N-methyl-N-nitroso-N-nitroguanidine (NTG) under standard conditions. Cells surviving UV and NTG treatment showed a 20–42% increase in proteolytic activity as compared with the parent strain. AS

68

[Characteristics of lactic acid bacteria in natural whey cultures. III. Acid production, prt mutants and flavour compound chromatograms.]

Bottazzi, V.; Battistotti, B.; Bersani, C.

Scienza e Tecnica Lattiero-Casearia 29 (2) 68–80 (1978) [11 ref. It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ. Cattolica, Piacenza, Italy]

Further tests were carried out on strains isolated from whey cultures used as starters in 2 Grana cheese production areas, as described in Parts I & II [see FSTA (1978) 10 8P1148 & 9P1362]. Many of the strains were

found to be proteinase-negative (prt$^-$) mutants which had reduced β-galactosidase activity and lower acid production capacity than proteinase-positive prt$^+$ strains. Spontaneous prt$^-$ mutants were found among Lactobacillus helveticus, L. lactis and L. fermentum. Certain heterofermentative strains of L. helveticus had greater acid production capacity than most of the homofermentative strains of this species and L. lactis. One heterofermentative strain of L. fermentum showed particularly fast growth at 45° C, far surpassing even the most active L. helveticus strains. 'Headspace' chromatograms [FSTA (1975) 7 9P2106] indicated that the heterofermentative strains produced large amounts of ethanol and acetone, while the homofermentative ones produced significant quantities of acetoin. The microbiological stabilization of whey starter cultures is discussed in the light of the findings. ADL

69

Stabilization of lactose metabolism in Streptococcus lactis C2.
Baldwin, K. A.; McKay, L. L.
Abstracts of the Annual Meeting of the American Society for Microbiology **78,** 191 (1978) [En] [Univ. of Minnesota, St Paul, Minnesota, USA]

An attempt was made to integrate the lactose plasmid of lactic streptococci into the chromosome in order to stabilize this trait for dairy fermentations. 60 lactose-positive (Lac$^+$) transductants of Streptococcus lactis C2 were induced for temperate phage by UV irradiation or mitomycin C. 4 transductants (18, 21, 54 and 58) yielded lysates which did not demonstrate lactose transduction. Successive transferring in the presence of acriflavine did not yield lactose-negative (Lac$^-$) segregants from these transductants, whereas S. lactis C2 and 3 other Lac$^+$ transductants showed 11.9 and 88.3% conversion from Lac$^+$ to Lac$^-$. When grown in continuous culture, transductant 21 did not show any Lac$^-$ variants in 168 h, while S. lactis C2 had 96% conversion from Lac$^+$ to Lac$^-$ in 144 h. Agarose gel electrophoresis of plasmid DNA isolated from transductants 18, 21, 54 and 58 were missing the lactose plasmid normally present in the Lac$^+$ transductants, suggesting integration of the transferred lactose plasmid into the chromosome. In contrast to phage lysates induced from S. lactis C2, UV irradiation of conc. phage induced from transductant 58 stimulated the transduction frequency for lactose metabolism which indicates chromosomal linkage for the marker and intergration of the lactose plasmid into the chromosome. AS

70

[Streptococcus thermophilus-M$_7$, used for production of cultured milk products and cheeses.]
Erzinkyan, L. A.; Pakhlevanyan, M. Sh.; Charyan, L. M.; Akopyan, L. G.; Vekilyan, S. M. **(Union of Soviet Socialist Republics,** Institut Mikrobiologii AN Armyanskoi SSR)
USSR Patent 591 508 (1978) [Ru]

Cell size in a 48-h culture in hydrolysed milk or whey agar is (0.4–0.7) × (0.5–0.7) μm, and the strain is Gram-positive and a facultative anaerobe. Suitable liquid media are milk and whey. In hydrolysed milk and whey agar, colonies are dull with smooth edges and a diam. of 2.5–6.0 μm. Max., min. and optimum growth temp. are 50°, 22–23° and 31–35° C, max. acid formation being 134° T. On addition of a 1% inoculum, milk is soured in 9 h, forming a dense homogeneous coagulum. The strain ferments glucose, galactose, lactose, sucrose, arabinose, fructose, dextrin and maltose. Proteolytic activity according to accumulation of tyrosine in milk is 1.8×10^{-4} Ansen units. After a culture has grown in milk the following free amino acids are found: cystine, lysine, histidine, arginine, asparagine, serine, glycine, glutamic acid, threonine, alanine, tyrosine, methionine + valine, phenylalanine, leucine + isoleucine, and tryptophan. W&Co

71

Evaluation of Lactobacilius casei for preparing frozen concentrated starter cultures.
Jakubowska, J.; Piatkiewicz, A.; Libudzisz, Z.
Acta Alimentaria Polonica 4 (2) 191–199 (1978) [27 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiologii, Politech., Lodz, Poland]

Of 9 culture media tested, best growth and biomass production (up to 1.6 g DM/l.) of 5 industrial strains of L. casei was obtained with one composed of 0.5% yeast autolysate, 1% casein hydrolysate, 1.5% lactose and 0.5% sodium citrate. The 3 strains that showed the best growth all retained most of their viability and acid-producing and proteolytic activities after 12 wk at −30° C as frozen concentrates. CDP

72

Physiological activity of Streptococcus diacetilactis and Lactobacillus casei strains in a continuous culture system.
Oberman, H.; Libudzisz, Z.
Acta Alimentaria Polonica 4 (2) 201–215 (1978) [29 ref. En, pl] [Inst. Tech. Fermentacji i Mikrobiologii, Politech., Lodz, Poland]

In continuous culture in a medium containing yeast autolysate, peptone, lactose and citrate, best biomass yields of Str. diacetilactis 239 and its UV mutant 20/1 resp. were obtained at dilution rates of 0.20–0.45 and 0.30–0.65 h; content of acetoin and diacetyl decreased with increase in flow rate, but the aroma-producing ability of the population was retained. No direct relationship was observed between dilution rate and proteolytic acitivity of the streptococci. L. casei W-10 and its 2 mutant strains No. 2 and 60/7, cultured continuously in a medium containing casein hydrolysate, yeast autolysate, lactose and citrate, showed highest biomass production at dilution rates of 0.07–0.15 h (0.10 h for L. casei 60/7). Highest caseolytic activity was observed at the lowest dilution rates. Lactic acid-producing activities in milk were not affected by dilution rate of the continuous culture from which they were obtained, with the exception of that of L. casei 60/7 grown at a dilution rate of 0.10 h, which was markedly increased. CDP

73

Action of bacteriophage on lactic acid bacteria: consequences and protection. [Review]
Lawrence, R. C.

New Zealand Journal of Dairy Science and Technology 13 (3) 129–136 (1978) [35 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

The author reviews various fundamental and applied aspects of bacteriophages of lactic acid bacteria. Phage differentiation using morphology and serology is discussed and related to host range data. Lysogenic starter bacteria and raw milk are considered as possible sources of phages in cheese plants. Phage typing of starter streptococci is considered in relation to the selection of phage unrelated strains for cheesemaking, the close relationship of modern starters, the role of modification/restriction systems and the consequential hazards of using high numbers of starters in a cheese factory. Temporal variation in phage sensitivity and possible involvement of plasmid encoded restriction systems, the complexities of phage-resistant mutants and the methodology of phage assay are all discussed in relation to cheesemaking. Finally, systems of cheesemaking in use in various countries and the introduction of 'direct vat addition' and 'direct acidification' are described in relation to phage build-up. FLD

74

Preservation methods for lactic starter cultures.
Cahalan, D.; Genigeorgis, C.
Abstracts of the Annual Meeting of the American Society for Microbiology 78, 331 (1978) [En] [Univ. of California, Davis, California 95616, USA]

To develop effective preservation methods for lactic starters to be used in fermented sausage manufacturing, methods for preparing and storing the starters were tested. Viable counts immediately after freezing or freeze-drying (FD) and at monthly intervals showed that, under proper conditions, original starter viability can be preserved for at least 8 months. Survival was much higher when cultures were frozen and stored at −13°C or FD and stored at −13° or 5°C than FD and stored at 30°C. Neither freezing speed nor cell concn. affected starter survival. Survival during storage was best at pH near 7.0. When cryoprotectants were included in starter resuspensions before FD and storage, good survial was observed with MSG, sucrose, and i-inositol; fair survival with yeast extract, malt extract, skim-milk, sodium ascorbate, and peptone; and poor survival with gelatin and glycerol. Usually low concn. of cryoprotectants were at least as effective as high concn. in the preservation of FD cultures. Cryoprotectants seemed to have no value in frozen cultures. Freeze-dried cultures stored better at low water activity than at high. When carrier powders were added to cultures after FD, survival during storage was higher with NaCl, sucrose, dried skim-milk, or no carrier than with gum arabic. Starters prepared and stored under conditions of optimum survival are now being tested for activity in the production of salami. AS

75

Lactic acid bacteria as an antispoilage and safety factor in cooked, mechanically deboned poultry meat.
Raccach, M.; Baker, R. C.
Journal of Food Protection 41 (9) 703–705 (1978) [15 ref. En] [Poultry Sci. Dep., Cornell Univ., Ithaca, New York 14853, USA]

The effects of commercial lactic acid starter cultures of Pediococcus cerevisiae (Accel) and Lactobacillus plantarum (Lactacel DS) on spoilage of and pathogen growth in cooked mechanically deboned poultry meat (MDPM) were studied. P. cerevisiae or L. plantarum or a 50/50 mixture was added to MDPM to give 10^9 cells/g or 2×10^9/g for the mixture. MDPM samples then received separate additions of Pseudomonas fluorescens, Ps. fragi, Ps. putrefaciens, Salmonella typhimurium or Staphylococcus aureus, in the range 10^3–10^4 cells/g MDPM. Cooked MDPM inoculated with Pseudomonas was stored at 3° C; addition of the lactic acid bacteria (LAB) mixture delayed time for off-odour production (10^7 Pseudomonas cells/g) to 4–5 days, a delay of 1–2 days vs. controls. The LAB mixture totally repressed growth of Salmonella in cooked MDPM stored at 11° C, and totally repressed growth of Staphylococcus in that stored at 15° C. The LAB mixture was more effective than either Pediococcus or Lactobacillus alone. The pH of cooked MDPM changed by a max. of 0.2–0.3 units in all experiments, a value too small to have caused the observed repression of growth. DIH

76

Formation of hydrogen peroxide by meat starter cultures.
Raccach, M.; Baker, R. C.
Journal of Food Protection 41 (10) 798–799 (1978) [7 ref. En] [Poultry Sci. Dep., Cornell Univ., Ithaca, New York 14853, USA]

Lactobacillus plantarum and Pediococcus cerevisiae were obtained as commercial meat starter cultures (Lactacel DS and Accel, resp.) and their H_2O_2 production was measured in broth suspension culture. H_2O_2 production was determined enzymically, with the end point measured spectrophotometrically at 400 nm. The organisms were examined at 10–35° C at a suspension density of 10^9 cells/ml. Max. H_2O_2 production was approx. 0.85 μg H_2O_2/ml suspension (L. plantarum after 3 days at 20° or 35° C.) Neither organism produced or accumulated sufficient H_2O_2 to explain bacteriostatic or bacteriocidal effects (against spoilage or pathogenic bacteria) observed with use of starter cultures. DIH

77

[Regulation concerning specific flora of yoghurt.]
Anon.
Technique Laitiere No. 925, 4 (1978) [Fr]

A decree dated 22 June 1978, published in Journal Officiel de la Republique Francaise of 22 July 1978, specifies that yoghurt, must contain ≥ 100 million viable specific thermophilic lactic acid bacteria (Streptococcus thermophilus and Lactobacillus bulgaricus) per g, on analysis ≤4 days after manufacture or (for imported yoghurt) after passage across the frontier. FL

78

Researches on the lactic acid bacteria of olives. Controlled fermentation experiments. (In 'Quelques problemes interessant les industries agricoles et alimentaires en zone mediterraneenne' [see FSTA (1979) 11 5G345].) [Lecture]
Balloni, W.; Brighigna, A.; Cucurachi, A.; Florenzano, G.
pp. 421-445 (Undated) [23 ref. En, de, fr] [Inst. of Agric. Microbiol., Florence Univ., Florence, Italy]

Detailed descriptions are given of studies on: microflora of green olives of the var. Ascolana, Nocellara, Caroleo and Cerignola; microflora of brines used for Ascolana, Nocellara, Ottobrarica and Cerignola grapes; microflora of spoiled brines; biochemical characteristics and fermentative capacity of 72 strains of lactobacilli; laboratory scale trials on controlled fermentation of olives using selected strains of Lactobacillus plantarum and L. brevis; and pilot plant experiments on controlled lactic fermentation of brines. Numerous tables of results are given and discussed in detail. The microflora of table olives differed from literature data for oil olives; appreciable differences in microflora were detected among the var. investigated. Stable brines (pH 3.8-4.2) are characterized by a lactic acid bacteria/yeast ratio of 100:1-200:1. The natural microflora of the olives closely resembled that of the brines. AJDW

79

Hemagglutinin hydrolysing microorganisms for soyidli batter.
Ramakrishnan, C. V.; Rao, G. S. Z.
Baroda Journal of Nutrition 4, 9-21 (1977) [50 ref. En] [Biochem. Dep., M. S. Univ., Baroda, Gujarat, India]

Among organisms isolated from soyidli batter (i) Leuconostoc mesenteroides (strain HA) and (ii) Lactobacillus buchneri were capable of breaking down the soy haemagglutinins found in the batter. (i) used alone can act as very good substitute for the other species found in batter in effecting fermentation and in the complete breakdown of haemagglutinins. The characteristics of L. mesenteroides (strain F) and L. mesenteroides (HA) are given. CFTRI

80

[Role of lactic acid bacteria starter in the formation of the physical properties of wheat dough.]
El'tsova, O. P.; Roiter, I. M.; Vitavskaya, A. V.; Orlova, N. K.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 3, 62-65 (1978) [5 ref. Ru] [Kievskii Tekh. Inst. Pishchevoi Promyshlennosti, Kiev, USSR]

The effect of Lactobacterium fermenti-27 starter on the formation of the physical properties of wheat dough was studied. The addition of the starter accelerated the ripening of the dough; the dough reached the desired rheological properties in a shorter time. The change in plastic and elastic properties was established better by alveography than by farinography. The ratio of elasticity and extensibility P/L 0.48-0.56 corresponded to 3.5 h of dough rising at dough pH 4.8-4.9 STI

81

The separation from yoghurt cultures of lactobacilli and streptococci using reinforced clostridial agar at pH 5.5 and plate count agar incorporating milk.
Johns, F. E.; Gordon, J. F.; Shapton, N.
Journal of the Society of Dairy Technology 31 (4) 209-212 (1978) [12 ref. En] [Express Dairy Foods Ltd., Ruislip, Middlesex, UK]

Reinforced clostridial agar with pH adjusted to 5.5 suppressed the growth of Streptococcus thermophilus during microaerophilic incubation in a 'candled' jar at 37° C, and enabled Lactobacillus bulgaricus to be isolated. The Str. thermophilus was isolated on plate count agar containing 10% skim-milk at pH 7.0; incubation was restricted to 24 h at 37° C, at which point of time colony development of Str. thermophilus was considerably more advanced than that of L. bulgaricus. CDP

82

[Symbiotic starters of thermophilic bacteria in the production of cultured milk products.]
Simbioticheskoe zakvaski termofil'nykh bakterii v proizvodstve kislomolochnykh produktov. [Book]
Koroleva, N. S.; Kondratenko, M. S.
168pp. (1978) [many ref. Ru] [Moscow, USSR; Pishchevaya Promyshlennost' Price 0.65r]

Results of recent research work carried out in the USSR and Bulgaria are presented. The following chapters are included: morphological, cultivation and biochemical properties of thermophilic lactic acid bacteria (pp. 7-16); isolation and identification of thermophilic lactic acid bacteria (pp. 18-24); research into the development of pure cultures and combinations of thermophilic lactic acid bacteria (pp. 25-69); factors affecting the viability of thermophilic lactic acid bacteria (pp. 70-95); storage of pure cultures and combinations of thermophilic lactic acid bacteria and the production of starters (pp. 96-119); the manufacture of cultured milk products and the use of symbiotic thermophilic starters (pp. 120-143); and methods for the control of starters (pp. 143-156). STI

83

[Kefir: study and use of a starter for the preparation of a drink.]
Vayssier, Y.
Revue Laitiere Francaise No. 362, 131-134 (1978) [6 ref. Fr] [Societe Lacto-Labo, BP 10-86220 Dange-Saint-Romain, France]

Kefir starters used in these studies contained lactic acid bacteria, comprising Lactobacillus brevis, L. cellobiosus, L. casei subsp. alactosus, Streptococcus diacetilactis, Str. lactis and Leuconostoc mesenteroides, and Saccharomyces florentinus as the sole yeast. A starter comprising the above species of lactic acid bacteria each at a concn. of 10^8/g and the yeast at 10^6/g yielded a sweetened water-based drink with excellent organoleptic properties. The starter could be used for the preparation of 3 successive drinks of comparable organoleptic quality without appreciable infection; the total populations of the lactic bacteria and yeasts remained stable, but L. brevis and L. cellobiosus became predominant whilst L. casei subsp. alactosus decreased.

Kefir made from whole or skim-milk had a very pleasant flavour corresponding to that of kefir produced commercially. FL

84

The potential roles of plasmid deoxyribonucleic acid in Streptococcus lactis, subsp. diacetylactis.
Kempler, G. M.; Larsen, L. D.; McKay, L. L.
Abstracts of the Annual Meeting of the American Society for Microbiology 78, 191 (1978) [En] [Univ. of Minnesota, St Paul, Minnesota, USA]

The ability to utilize citrate and to metabolize lactose are unstable properties in Streptococcus lactis subsp. diacetylactis (SLD) 18-16 and DRC-1; therefore, the linkage of these traits to plasmid DNA was examined. CsCl-ethidium bromide equilibrium density gradients of cleared lysate material from each strain revealed the presence of a satellite peak characteristic of covalently closed circular (CCC) DNA. Samples of the CCC DNA were subjected to agarose gel electrophoresis to determine the plasmid composition of each strain. Relative mobility curves, using Escherichia coli plasmid DNA as standards, were used to establish the mol. wt. of the individual plasmid spp. SLD 18-16 was found to possess 6 plasmids having mol. wt. of 34, 25, 6,6, 5.2, 3.6, and 3.1 Mdalton. SLD DRC-1 contained 6 plasmids of mol. wt. 34, 27, 14, 5.2, 4.6 and 3.5 Mdalton. Variants of SLD 18-16 which failed to produce acetoin plus diacetyl from citrate (Cit^-) were found to be missing the 5.2 Mdalton plasmid. Lactose-negative (Lac^-) Cit^- mutants from the same strain were devoid of both the 5.2 and 34 Mdalton plasmids. Lac^- mutants of SLD DRC-1 were also found to be missing a 34 Mdalton plasmid. These results suggest that citrate utilization and lactose metabolism may be plasmid mediated in SLD 18-16 and DRC-1. AS

85

Sucrose agar and its modification for the selective growth of distillery isolates of the lactic acid bacteria.
Dolan, T. C. S.; Morgan, W. J.
Journal of the Institute of Brewing 84 (6) 327-331 (1978) [11 ref. En] [Highland Distilleries Co. Ltd., Knockando, Moray, UK]

Modified sucrose agar can be rendered selective, for lactic acid bacteria encountered in the malt whisky industry, by the incorporation of the 2 antibiotics cycloheximide (actidione) and 2-phenylethanol coupled with incubation under anaerobic conditions (atmosphere of CO_2). Under these conditions, growth of Gram negative bacteria and yeasts is suppressed and Lactobacillus sp. can be differentiated from Pediococcus sp. AS

86

Elevation of Pediococcus cerevisiae subsp. dextrinicus Coster and White to species status [Pediococcus dextrinicus (Coster and White) comb. nov.].
Back, W.
International Journal of Systematic Bacteriology 28 (4) 523-527 (1978) [10 ref. En] [Mikrobiol. Abteilung, Döhler GmbH & Co. KG, 6100 Darmstadt, Federal Republic of Germany]

Studies on dextrin-forming L-(+)-lactic acid-producing strains of P. cerevisiae subsp. dextrinicus (including isolates from beer, beer bottles and spent grain) showed that these represent a new sp., P. dextrinicus (Coster & White) comb. nov. A detailed description of the morphology, mode of division, growth requirements, DNA base ratios etc. of this new sp. is given. AJDW

87

Nutritive quality of fermented cowpeas (Vigna sinensis) and chickpeas (Cicer arietinum).
Zamora, A. F.; Fields, M. L.
Journal of Food Science 44 (1) 234-236 (1979) [17 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Missouri, Columbia, Missouri 65211, USA]

Cowpeas and chickpeas were allowed to undergo natural fermentation for 4 days at 25°C. The microorganisms isolated from cowpeas and chickpeas were Lactobacillus casei, L. leichmanii, L. plantarum, Pediococcus pentosaceus and P. acidilactici. Lactobacillus helveticus was found in chickpeas only. This makes the fermentation chiefly lactic acid. Pathogenic organisms were not found in the system. Relative nutritive value (RNV) and limiting amino acids increased significantly ($P < 0.05$) in the fermented beans. Niacin decreased significantly ($P < 0.05$) in both of the fermented beans. Thiamin decreased in fermented chickpeas while riboflavin increased in fermented cowpeas. Trypsin inhibitor decreased significantly ($P < 0.05$) in both of the fermented beans. Raffinose was eliminated in cowpeas and decreased significantly ($P < 0.05$) in fermented chickpeas. IFT

88

[Changes in the active acidity of dough and bread under the influence of mesophilic lactic acid bacteria.]
Vitavskaya, A. V.; Shin, A. P.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 8, 20-21 (1978) [Ru] [Kazgipropishcheprom, USSR]

The active acidity affects the colloids and microbiological and fermentation processes in semi-manufactured products and the taste of the final products. Lactobacillus fermenti (strain 27) action was studied, with respect to the fermentation of the sponge and the dough prepared using different procedures; the effect of the starter on acidity and pH of bread was also investigated. Grade I and II wheat flour, dough and bread were studied. In straight and indirect dough processes the pH drops in the sponge and in the dough if lactic starter is added. Bread containing starter with L. fermenti has active acidity of 5.4-5.3°, titratable acidity of 3.2-3.6°; without the starter these are 6.5-6.4° and 2.6-2.8°, resp. The experimental bread had good taste, aroma, crumb and porosity. When L. fermenti, strain 27, is added during the initial period of the straight and indirect dough processes, the pH drops to 5.5-5.3, i.e. optimal for the activation of the flour enzymes and microorganisms. This pH level in dough is a factor weakening the action of α-amylase. STI

89

[Effect of water activity on development of lactic acid bacteria.]
Gudkov, A. V.; Fedin, F. A.
Molochnaya Promyshlennost' No. 10, 20–23, 46 (1978) [6 ref. Ru] [[Nauchno-Proizvodstvennoe Ob"edinenie 'Uglich', Uglich, USSR]

(i) Streptococcus cremoris, (ii) Leuconostoc lactis, (iii) Str. diacetilactis, (iv) Str. diacetilactis subsp. acetoinicus, (v) Str. lactis, (vi) Lactobacillus plantarum, and (vii) Str. faecalis were grown in meat-peptone broth or in reconstituted dried skim-milk at 0.930–0.997 water activity (A_w) ranges, different A_w being obtained in the former medium by addition of NaCl and in the latter by addition of dried skim-milk. Results with both media were similar. A_w values below which no growth occurred were: (i) and (ii) 0.975, (iii) and (iv) 0.960, (v) 0.955, (vi) 0.950, and (vii) 0.935. The significance of these findings in cheesemaking is considered in the light of the experiments of Gudkov & Fedin [FSTA (1977) 9 10P1657] in which the same tensimetric method for A_w detn. was used. SKK

90

[Streptococcus thermophilus strain 28M, for use in two-strain inocula for preparation of the cultured milk products ryazhenka, Mechnikov prostokvasha, snezhok, varenets and yoghurt.]
Koroleva, N. S.; Mel'nikova, E. V. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti)
USSR Patent 603 660 (1978) [Ru]

The strain is stored in the collection of the All-Union Research Institute for the Milk Industry. Cells in a 17-h culture are cocci, 0.6–0.8 μm in diam., uniformly coloured and present as singles, pairs or chains of 5–10 cells. In hydrolysed milk agar, 2-day colonies are round, white and measure 0.4–0.6 mm, and the strain forms a uniform turbidity in liquid hydrolysed milk. A dense uniform coagulum is formed in whole milk, sometimes with vertical grooves. Optimum growth temp. is 43° C. Glucose, sucrose and lactose are fermented, gelatin is not liquefied, and milk is coagulated by 1% inoculum at optimum temp. in 3.5–4.0 h. Acidity reaches 80° T after 18 h. The strain grows in milk containing 0.01–0.05 IU penicillin/ml. The growth of Escherichia coli is suppressed in filtrates of the culture fluid of the strain in dilutions of 1:2 and 1:4. The strain exhibits resistance to bacteriophage. W&Co

91

Determination of growth rates of lactic starter cultures.
Cogan, T. M.
Irish Journal of Food Science and Technology **2** (2) 105–115 (1978) [14 ref. En] [An Foras Taluntais, Moorepark Res. Cent., Fermoy, Co. Cork, Irish Republic]

Similar growth curves were obtained when either log adsorbance or log developed lactate (> 0.1 mg/ml) was plotted against time. It was therefore considered feasible that developed lactate could be used to estimate growth of starter bacteria in skim-milk. From the exponential phase of the growth curves, an equation was developed from which the time required to reach different levels of lactate at different specific growth rates could be calculated. Average specific growth rate of pure and mixed strain mesophilic starters was 0.31/h at 21° C (equivalent to generation time of 2.24 h) and the exponential phase of lactate production ended when 3–5 mg lactate/ml had been produced. Average specific growth rate of 3 single strains at 30° C was 0.61/h (generation time 68 min). The slow starter culture Streptococcus cremoris AM1 showed 2 different specific growth rates at 30° C (generation times of 76 and 93 min), but only 1 at 21° C. CDP

92

[Measurement of CO_2 production by lactic acid bacteria.]
Waes, G.
Lait 58 (578) 469–482 (1978) [5 ref. Fr, en] [Sta. Laitiere de l'Etat, Melle, Belgium]

Carbon dioxide production in milk by cheese starters was determined by an established Warburg method, and by the same method modified by the addition of sodium bicarbonate and the use of N_2 gassing before, rather than after, starter inoculation. Rates of CO_2 production were similar when determined by either procedure and were related to rates of citrate utilization by corresponding starters in cheese. Both methods were considered adequate for comparing gas-forming cultures for use in cheese in which eye formation is necessary. However, the modified method was favoured because of its superior reproducibility. BAL

93

[Streptococcus lactis strain No. 3938-S^r, used for detecting bacteriophages of lactic acid streptococci.]
Gudkov, A. V.; Fomichev, Yu. K.; Sel'skov, A. N.; Dokukin, V. M. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti; **Union of Soviet Socialist Republics,** Belorusskii Gosudarstvennyi Universitet im. V. I. Lenina)
USSR Patent 605 833 (1978) [Ru]

The culture is stored in the collection of the All-Union Research Institute for the Butter and Cheese Industry. Cells of 24-h cultures on hydrolysed milk agar are ellipsoidal, 1.0–1.1 μm, and present mainly as diplococci with some short chains. A thick uniform suspension is formed in hydrolysed milk broth, giving a granular sediment which is readily re-suspended on shaking. Inoculation of fresh hydrolysed milk broth with 1% of an 18-h culture results in a lag-phase of 60 min. A max. cell concn. of $8–10 \times 10^8$ cells/ml is reached after 7 h at 30° C. Growth capacity is retained in broth with 1000 IU streptomycin/ml. Inoculation of milk with 1% of an 18-h culture gives a coagulum in 11–12 h. Inoculation of meat-peptone gelatin gives weak growth along the stab line with no liquefaction. On hydrolysed milk agar 2-day colonies are round, smooth, white, shiny and convex with a smooth edge, and measure 0.8–1 mm. The strain ferments glucose, galactose, lactose and maltose with formation of acid, but does not utilize sucrose and mannitol. The strain is sensitive to 24 naturally occurring virulent bacteriophages of lactic acid streptococci. W&Co

94

Lactic acid bacteria (including the leuconostocs). [Lecture]
Sharpe, M. E.
XX International Dairy Congress, Conferences Conferences 1ST, 24pp. (1978) [76 ref. En] [Nat. Inst. for Res. In Dairying, Shinfield, Reading RG2 9AT, UK]

This review covers: identification of lactic acid bacteria; their growth and metabolism in milk, and their role in proteolysis, glycolysis and flavour production (especially in cheese); their stimulatory and inhibitory effects on other organisms; spoilage effects of certain strains of lactic acid bacteria; and recent technological advances in use of concentrated starters (which may be frozen or lyophilized) and in continuous yoghurt manufacture. This paper is also published in Journal of the Society of Dairy Technology (1979) 32 (1) 9-18. [See FSTA (1979) 11 6P883.] ADL

95

Action of bacteriophages on lactic acid bacteria. Consequences and protection. [Lecture]
Lawrence, R. C.
XX International Dairy Congress, Conferences Conferences 2ST, 15pp. (1978) [36 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Subjects covered in this paper include: differentiation of the various phages attacking mesophilic and thermophilic starters; sources of phage contamination in cheese plants; differentiation of starter strains by phage typing; ways of monitoring phage contamination; and the various starter systems which have been devised to prevent phage build-up, namely the Dutch (continuous use of a single mixed starter of undefined composition), US (rotation of mixed starters) and New Zealand (use of defined single strains). [See FSTA (1979) 11 6P883.] ADL

96

[Yoghurt: symbiosis between the 2 yoghurt microorganisms.] [Lecture]
Bottazzi, V.
XX International Dairy Congress, Conferences Conferences 42ST, 7pp. (1978) [44 ref. Fr] [Univ. Cattolica del Sacro Cuore, 84, Via Emilia Parmense, 29100 Piacenza, Italy]

The actions and interactions of Lactobacillus bulgaricus and Streptococcus thermophilus are reviewed, including the effects of the normal metabolites of one sp. on the other, the technological aspects of this symbiosis, and its modification in the presence of other starter organisms such as L. acidophilus, Bifidobacterium bifidum or Pediococcus acidilactici. Other aspects covered are the production of antibiotic substances in yoghurt, and the possible effects of yoghurt on tumour development, bacterial enterotoxins, and blood cholesterol. [See FSTA (1979) 11 6P883.] JMD

97

Lactobacilli with improved performance for cultured milk products.
Jasjit Singh; Ranganathan, B.; Srinivasan, R. A.
Indian Dairyman 30 (11) 765-767 (1978) [3 ref. En] [Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal-132 001, Haryana, India]

Lactobacilli were subjected to γ-irradiation to produce mutants with faster acid production and increased proteolytic activity. 5 mutants of Lactobacillus bulgaricus and L. casei were selected and when grown along with streptococci they produced approx. 30% more acid than their parent cultures. CFTRI

98

[Counting group D streptococci in dried milk.]
Belgium, Societe Belge de Zymologie Pure & Appliquee
Revue des Fermentations et des Industries Alimentaires 33 (2) 59-60 (1978) [2 ref. Nl, fr]

Comparative tests in 5 laboratories indicated that KF Agar (Difco) was more suitable than Packer's medium for routine laboratory counting of group D streptococci in dried milk. Although the media differed little in sensitivity and selectivity (virtually 100%), KF Agar required only 4 (vs. 5) days' incubation at 37°C, and the addition of blood is considered a disadvantage in the case of Packer's medium. Almost all colonies growing on the media were definitively identified as group D streptococci in confirmatory tests (negative catalase test; growth on Bile Aesculin Agar, 2 days at 30°C; and growth at 45 ± 0.1°C in Tryptone Soya Broth). These tests are considered advisable for confirmation of routine results. ADL

99

Serological studies of a host range mutant of a lactic streptococcal bacteriophage.
Jarvis, A. W.
Applied and Environmental Microbiology 36 (6) 785-789 (1978) [16 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

A host range mutant was isolated from a bacteriophage that attacked Streptococcus cremoris 114. The mutant was able to adsorb and grow on S. cremoris 266, where the parent phage could not. The mutant phage was unable to adsorb to the original bacterial host, S. cremoris 114. HBr

100

Isolation and characterization of plasmid DNA in Streptococcus cremoris.
Larsen, L. D.; McKay, L. L.
Applied and Environmental Microbiology 36 (6) 944-952 (1978) [32 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St Paul, Minnesota 55108, USA]

9 industrially important strains of S. cremoris (HP, AM_2, ML_1, WC, C_3, R_1, E_8, KH, and Wg_2) were shown to possess a diversity of plasmid molecules. The mol. wt. of the plasmids were determined from their relative mobilities after agarose gel electrophoresis and via electron microscopy. HBr

101

Lactic fermentations of dairy foods and their biological significance. [Review]
Kilara, A.; Shahani, K. M.

Journal of Dairy Science 61 (12) 1793–1800 (1978) [26 ref. En] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska 68583, USA]

In this review, changes induced in milk constituents by microorganisms are discussed with regard to flavour, texture, and nutritive value. The significance of such modifications is considered in terms of microbial synthesis of vitamins, natural antibiotics, natural anticarcinogenic substances, and enzymes. Studies concerned with the physiological implications and nutritional and therapeutic significance of such modifications are described. MEG

102

[Wheat germ beverage.]
Hagiwara, Y.
Japanese Examined Patent 5 341 223 (1978) [Ja]

An aqueous solution of wheat germ and a starch liquefying enzyme is heated, filtered and concentrated under reduced pressure. The solution is then cultured with Lactobacillus bulgaricus and sugar added to yield a beverage having good nutritional properties. IFT

103

Growth inhibition of lactic acid bacteria. II. Competitive relationship between dipeptides.
Munekata, M.
Bulletin of Brewing Science 23, 15–26 (1977) [7 ref. En] [Safforo Breweries Ltd., Tokyo, Japan]

DL alanine-DL serine and DL alanine-L alanine are growth inhibitors against Lactobacillus brevis. Their mode of activity is thought to be different from that of L valine-L valine-D valine, since the dipeptides are hydrolysed by a suspension of the microorganism. The free amino acids alanine and serine did not inhibit the growth of L. brevis even at concn. >200x higher than that of the peptides. The reversal activity of glycine-L leucine was different from that of free glycine, and the competitive relationship was shown only by the dipeptides. [See FSTA (1977) 9 3H470 for part I.] AS

104

[The taxonomy of the genus Pediococcus. The phenotype and genotype limits of the types of Pediococcus previously identified together with the description of a new sub-race which is detrimental to beer quality: Pediococcus inopinatus.] Zur Taxonomie der Gattung Pediococcus. Phänotypische und genotypische Abgrenzung der bisher bekannten Arten sowie Beschreibung einer neuen bierschädlichen Art: Pediococcus inopinatus.
Back, W.
Brauwissenschaft 31 (9) 237–250; (11) 312–320; (12) 336–343 (1978) [71 ref. De, en, fr] [Firma Döhler GmbH & Co. KG, Riedstrasse 9, 6100 Darmstadt, Federal Republic of Germany]

840 Pediococcus colonies isolated from varying sources were identified according to their phenotype and genotype. It was found that, as well as the previously known types P. pentosaceus, P. acidilactici, P. parvulus, P. damnosus (= P. cerevisiae) and P. halophilus, 2 further types were identified: P. inopinatus and P. dextrinicus. Others, largely types isolated from plant material, were found which could not ferment arabinose and xylose and thus had been named as P. damnosus or P. cerevisiae, showed in their genotype a high level of homology with typical pentosaceus types and thus have been newly ascribed as P. pentosaceus sub-species intermedius. For the identification of the individual types, the following classical characteristics played a particularly important role: fermentation of ribose, arabinose, xylose and lactose, splitting of starch and arginine, acid and gas production from sodium gluconate, growth at 35° and 50°C at a pH of 8.0 and in the presence of 15% NaCl. An additional characterization was carried out on the basis of the electrophoretic mobility of the lactate dehydrogenase and with the help of DNA homology. As opposed to the well-known species P. damnosus, which is well known and feared (present in 97% of infected beers), it was further established that the newly described P. inopinatus is a species which must be guarded against. It is particularly interesting to note that P. damnosus could only be identified in beer, beer yeast, wine and apple wine, but not in brewing raw materials or plant materials. This indicates an advanced specialization of this species in association with the fermentation industry. TUB-IGB

105

[Lactic acid bacteria candy.]
Lotte Co. Ltd.
Japanese Examined Patent 5 337 430 (1978) [Ja]

A process for the production of candy compositions containing lactic acid bacteria together with conventional ingredients (sugar, citric acid, water, colouring) is described. IFT

106

Microbiology of the soda cracker process. II. Pure culture fermentation studies.
Sugihara, T. F.
Journal of Food Protection 41 (12) 980–982 (1978) [4 ref. En] [W. Regional Res. Cent., Sci. & Education Administration, USDA, 800 Buchanan Street, Berkeley, California 94710, USA]

Stable, pure-culture, frozen concentrates of Lactobacillus plantarum, L. delbrueckii and L. leichmannii were developed for use in fermentation of soda cracker sponge and dough. Sponge fermentation time was reduced from the conventional 18 h to 4 h. Dough fermentation time was also reduced from 4 h to 2 h. The conventional 24-h soda cracker process could be reduced to 8 h by the use of pure-culture technology. [See preceding abstr. for part I.] AS

107

[Formation of organic acids by nisin-forming strains of Streptococcus lactis.]
Krasnikova, L. V.; Sileva, M. N.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 45–47 (1978) [4 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, Leningrad, USSR]

108

[Detection of bacteriophages of mesophilic lactic streptococci on different nutrient media.]
Mytnik, L. G.; Bannikova, L. A.; Bobrova, L. V.
Molochnaya Promyshlennost' No. 7, 17–19, 47 (1978) [5 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

It is concluded from tests with 3 virulent phages of mesophilic lactic streptococci that their detection should be carried out simultaneously on a solid medium of agar with hydrolysed milk and on a liquid medium of sterilized skim-milk with bromocresol purple or methylene blue. Best detection was obtained by titration after incubation for 6 h at 30°C. SKK

109

[Kefir microorganisms: lactic acid bacteria.]
Rosi, J.; Rossi, J.
Scienza e Tecnica Lattiero-Casearia 29 (5) 291–305 (1978) [33 ref. It, en] [Istituto di Microbiol. Lattiero-Casearia, Univ., Perugia, Italy]

Streptococci isolated from liquid kefir were identified on the basis of morphological and biochemical characteristics as Str. durans (10^6/ml). They were not found in the kefir grains. Lactobacilli which did not produce extracellular polysaccharides as determined by the method of Raibaud et al. [Journal of Applied Bacteriology (1961) 24, 285], appeared to be of the species Lactobacillus brevis, with counts of 10^6/g or ml both in the grains and in the liquid kefir. Capsulated lactobacilli isolated had some characteristics suggesting that they belonged to the Streptobacterium group, although they were not typical members of this group. Capsulated leuconostocs found both in the grains and the liquid kefir (10^5/g or ml) were identified as Leuc. mesenteroides. ADL

110

[Preliminary studies on application of starter cultures in the manufacture of fish products.] Orientierende Untersuchungen zum Einsatz von Starterkulturen bei der Herstellung von Fischerzeugnissen.
Schubring, R.; Kuhlmann, W.
Lebensmittel-Industrie 25 (10) 455–457 (1978) [8 ref. De, en, fr, ru] [VEB Fischkombinat Rostock, German Democratic Republic]

Studies were conducted on the use of Pediococcus cerevisiae starters in the processing of comminuted fish meat products made from cod, horse mackerel, sardines, sea breams and redeyes (Emmelichthys spp.). Products made with starter culture and 1.5% NaCl and heat treated at 50°C for 6 h were of good quality, even after storage for 4 days at 4°C or frozen storage at −18°C for 4 months. The flavour, aroma and storage life were favourably influenced by starter addition. Tables of data are given for pH, water loss during heat treatment, and concn. of crude protein, crude fat, moisture, crude ash and NaCl in the products. Trials on manufacture of an NaCl-free non-heat-treated product were unsuccessful. It is suggested that use of the starter might be advantageous in the manufacture of comminuted products from underutilized fish spp. AJDW

111

[Production of organic acids by Pediococcus halophilus in soy sauce fermentation.]
Kanbe, C.; Iwasa, T.; Sakasai, T.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] 52 (8) 329–334 (1978) [12 ref. Ja, en] [Cent. Res. Lab., Kikkoman Shoyu Co. Ltd., Noda-shi, Chiba-ken, Japan]

Organic acids in 20 batches of soy sauce mash were determined at several fermentation stages using a carboxylic acid analyser. Pyroglutamic, lactic, acetic and succinic acids increased, whereas malic and citric acids decreased, during ageing. A high positive correlation ($r = 0.90$) was observed between amounts of lactic and acetic acids. Similarly there was a high negative relationship between amounts of lactic and citric acids ($r = 0.905$). Production of organic acids by 12 strains of Pediococcus halophilus isolated from soy sauce mash were studied. In a glucose medium 1.71 mol lactic acid, 0.28 mol acetic acid and 0.17 mol formic acid were formed for each mol of glucose consumed. In a citric acid medium, the respective productions of the 3 acids were 0.16, 1.86 and 0.59 mol for each mol of citric acid consumed. Utilization of malic acid was not observed in these 12 strains. [From En summ.] JRR

112

[The microflora of sourdough. V. Vitamin requirements of lactic acid bacteria (genus Lactobacillus Beijerinck) in sourdough starters and sourdough.] Die Mikroflora des Sauerteiges. V. Das Vitaminbedürfnis der in 'Reinzuchtsauern' und in Sauerteigen anzutreffenden stäbchenförmigen Milchsäurebakterien (Genus Lactobacillus Beijerinck).
Spicher, G.; Schröder, R.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 168 (3) 188–192 (1979) [15 ref. De, en] [Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, D-4930 Detmold 1, Federal Republic of Germany]

The vitamin requirement patterns of 103 strains of lactic acid bacteria (54 from a starter culture, 49 from sourdoughs) were determined, and compared with those of reference strains of various Lactobacillus spp. The results confirm the presence of Lactobacillus acidophilus, L. casei, L. plantarum, L. farciminis, L. alimentarius, L. brevis, L. buchneri, L. fermentum and L. fructivorans in sourdoughs. Differences in vitamin requirements between the subgenera Betabacterium, Streptobacterium and Thermobacterium are discussed; a marked difference was observed only for thiamin requirements, Betabacterium requiring this vitamin, wheras the other 2 subgenera do not. [See FSTA (1979) 11 4M399 for part IV.] AJDW

113

Acitivity of Lactobacillus casei and its gamma-radiation induced mutant in different types of milk.
Jasjit Singh; Ranganathan, B.
Milchwissenschaft 34 (2) 91–92 (1979) [14 ref. En, de] [Nat. Dairy Res. Inst., Karnal, Haryana, India]

L. casei (RTS), and its γ-irradiation induced mutant (LC-1) which had increased proteolytic activity, were

used to inoculate samples of skim milk from cows, buffaloes and goats. Before inoculation, milk samples were steamed for 30 min and then cooled to 30°C. After incubation at 37°C for 24 h, the milks were examined for flavour, acid production and proteolysis. Both the parent and mutant strains of L. casei produced higher titratable and volatile acidities and had higher proteolytic activity in buffaloes' milk than in cows' or goats' milks. No diacetyl or acetoin was produced in any of the milk samples. MEG

114

Evaluation of commercial phage inhibitory media.
Gulstrom, T. J.; Pearce, L. E.; Sandine, W. E.; Elliker, P. R.
Journal of Dairy Science 62 (2) 208–221 (1979) [35 ref. En] [Dep. of Microbiol., Oregon State Univ., Corvallis, Oregon 97331, USA]

7 commercially prepared brands of lactic streptococcal phage inhibitory media were studied. Media were compared for buffering capacity, ability to support lactic streptococcal growth, and ability to suppress bacteriophage replication. Skim-milk was the control medium. Only 2 of the media were adequate in preventing phage proliferation, and the capacity of any 1 medium to stop phage proliferation and growth was related to its buffering capacity. Compositional data indicated that those media which were most effective in preventing phage replication contained sufficient nutrients to support streptococcal growth, thus overcoming the effects of high phosphate and/or citrate concn. which depressed growth. The medium which supported the best streptococcal growth (compared with skim-milk) was intermediate in suppressing phage proliferation. The 4 most effective phage inhibitory media each contained citrate buffers whereas the 3 least effective media lacked this compound; the most effective medium also contained hydrolysed cereal solids to enhance streptococcal growth. AS

115

The metabolism of pyruvate and citrate in the thermoduric cheese starter Streptococcus faecium (Streptococcus durans).
Coventry, M. J.; Hillier, A. J.; Jago, G. R.
Australian Journal of Dairy Technology 33 (4) 148–154 (1978) [17 ref. En] [Russell Grimwade School of Biochem., Univ. of Melbourne, Parkville, Victoria, Australia]

The metabolism of pyruvate in Streptococcus faecium resembled that of the group N streptococci. The main products formed from pyruvate were acetate, CO_2, acetoin + diacetyl and lactate. Acetate appeared to be formed via the pyruvate dehydrogenase system and acetoin + diacetyl was formed only after the acetate-forming pathway had become saturated. The metabolism of citrate by Str. faecium was similar to that observed in Str. lactis subsp. diacetylactis and CO_2 and acetate were the major products formed. 1 strain of Str. faecium did not metabolize citrate and did not possess citrate lyase activity. The role of thermoduric starters in the formation of texture defects in Cheddar cheese manufactured by the New Way Method [2-stage cooking of the curd, reducing the time of make by 1.5 h, with 2nd heating at 42–46°C and using a thermoduric starter together with the normal one] is discussed. AS

116

[Characteristics of lactic acid bacteria in natural whey cultures. IV. Tests to determine culture characteristics.]
Bottazzi, V.; Sarra, P. G.; Vescovo, M.; Bersani, C.
Scienza e Tecnica Lattiero-Casearia 29 (6) 367–381 (1978) [12 ref. It, en] [Istituto di Microbiol., Univ. Cattolica, Piacenza, Italy]

Further tests were carried out on 21 whey cultures used as starters in 2 Grana cheese production areas (Parma and Reggio Emilia; Piacenza and Cremona) [see FSTA (1978) 10 8P1148 & 9P1362, & FSTA (1979) 11 4P631]. Microbiological composition of the cultures was determined by a system based on DNA thermal denaturation curves. 2 types of denaturation curves were obtained: curve A, when >90% of the flora was Lactobacillus helveticus; and curve B, when >20% was L. lactis or L. fermentum. A 'dominance index' was devised, based on the deviation from the curve for L. helveticus (used as reference). This index, together with specific lactate dehydrogenase (LDH) activity and 'headspace chromatograms', was used to evaluate the suitability of each culture for use in industrial cheese manufacture. The cultures which were considered most suitable had the following characteristics: denaturation curve A; dominance index >4; LDH activity <1500 units/mg protein; and only very slight ethanol production. Cultures with denaturation curve B which contained a high proportion of L. fermentum were considered unsuitable. A further evaluation scheme is also proposed, based on proteolytic and acid-producing properties. [See also FSTA (1978) 10 10P1746.] ADL

117

The effect of freeze-drying on the behaviour of some lactic acid cultures variously treated.
Naghmoush, M. R.; Girguis, E. S.; Guirguis, A. H.
Annals of Agricultural Science, Moshtohor 8, 77–84 (1977) [8 ref. En, ar] [Food Sci. Dep., Cairo Univ., Cairo, Egypt]

3 lactie acid bacteria were variously treated before freeze-drying (FD) by adding yeast extract, vitamin E, vitamin C, Tween 80 or sheep serum to a basal medium and by cell concn. and adjustment of pH to 6.9. In general, FD had no significant effect on the total cell count (TCC) of the cultures. In comparison to the control, addition of yeast extract and vitamin C, and cell concn. were the treatments most effective in increasing the TCC of cell cultures after FD. FD also did not affect the viable count; this was highest after addition of Tween 80, vitamin E and after cell concn. Activity of cell cultures was not significantly affected by FD; Lactobacillus bulgaricus was more resistant to the process than the other organisms (Streptococcus thermophilus and S. lactis). JRR

118

[Manufacture of cured meat products with the aid of starter cultures.] Herstellung von Pökelwaren unter Verwendung von Starterkulturen.

Schiefer, G.; Schöne, R.
Fleisch 32 (11) 215–216 (1978) [8 ref De]
[Veterinärhygiene-Inspektion des Bezirkes Leipzig, German Democratic Republic]

Use of a Pediococcus cerevisiae Pc30 starter culture in the manufacture of (i) 'Lachsschinken' and (ii) 'Nusschinken' both ham products, and (iii) 'Schinkenspeck', a cured ham fat product, was studied. The raw materials for (i), (ii) and (iii) were held in saturated brine for 12, 24 and 36 h resp., then injected with curing brine containing P. cerevisiae at a count of 10^9/ml. The products were then smoked at 28–30°C for 12–24 h, after which they were evaluated organoleptically and their colour measured spectrophotometrically. Products made with the starter were of better quality than traditionally-manufactured products. Use of starters considerably reduced the duration of processing relative to traditional methods, from 4 days to 1 day for (i), from 4 wk to 2–3 days for (ii), and from 3 wk to 2–3 days for (iii). IN

119

Random number sampling method for estimation of lactic acid bacteria.
Ordonez, J. A.
Journal of Applied Bacteriology 46 (2) 351–353 (1979) [9 ref. En] [Inst. de Productos Lacteos, CSIC, Apartado 78, Arganda del Rey, Madrid, Spain]

The method is based on growth in Eilliker agar [Journal of Dairy Science (1956) 39, 1611–1612] and identification of 20% of the colonies, selected by the random number sampling procedure. The efficiency of the procedure was checked using mixtures of 6 lactic acid bacteria isolated from cheese (Streptococcus lactis, S. cremoris, S. faecalis, Lactobacillus cellobiosus, Lb. casei and Leuconostoc dextranicum). Numbers of organisms estimated to be present agreed closely with numbers known to be present in the mixtures. MEG

120

Electrode system for the determination of microbial populations.
Matsunaga, T.; Karube, I.; Suzuki, S.
Applied and Environmental Microbiology 37 (1) 117–121 (1979) [10 ref. En] [Res. Lab. of Resources Util., Tokyo Inst. of Tech., Nagatsuta-cho, Midori-ku, Yokohama, 227 Japan]

The rapid and continuous method described for the detn. of microbial populations uses a system composed of 2 similar electrodes having a Pt anode and an Ag_2O_2 cathode. The anode of one of the electrodes (the reference electrode) is covered with a cellulose dialysis membrane. An anion exchange membrane (Selemion Type AMV) was used as a separator. The response time of the electrode system was 15 min in culture broth, and current differences between the 2 electrodes were proportional to cell numbers of Saccharomyces cerevisiae or of Lactobacillus fermentum in broth cultures. The current difference was reproducible, with an average relative error of 5% when the broth contained 2×10^8 S. cerevisiae cells/ml. MEG

121

Microbial calorimetry as an analytical method.
Monk, P. R.
Process Biochemistry 13 (12) 4–5, 8 (1978) [26 ref. En] [Australian Wine Res. Inst., Glen Osmond, S. Australia, Australia]

Fundamental aspects relating to microbial calorimetry and to its utilization as an analytical method are reviewed. Particular reference is made to the metabolism of lactic acid bacteria and to its calorimetric analysis. Thermograms obtained for several such bacteria are included and discussed: for Streptococcus cremoris, Str. lactis subsp. diacetylactis, Str. lactis and Leuconostoc cremoris grown in a defined medium; for Str. thermophilus and Lactobacillus bulgaricus grown in a milk medium; for a mixed culture of Str. lactis and Str. cremoris grown in a defined medium; and for Str. lactis grown in a defined medium after frozen storage for ≤ 17 days. Possible applications of microbial calorimetry are also considered, e.g. for identifying bacterial spp. and strains (for which a completely defined medium is required), for monitoring potable water and bulk-prepared foodstuffs for bacterial contamination. JA

122

The detection of lactic acid bacteria.
Lawrence, D. R.; Leedham, P. A.
Journal of the Institute of Brewing 85 (2) 119–121 (1979) [18 ref. En] [Whitbread & Co. Ltd., Luton, Bedfordshire, UK]

An examination of lactic acid bacteria involved in beer spoilage demonstrated that many pediococci and lactobacilli are capable of growth on glucose media but incapable of growth on sucrose within 6 days. Some lactobacilli are incapable of utilizing glucose for growth and are also unable to grow on media based on sucrose. All lactobacilli studied which could not utilize glucose could utilize maltose. Results presented suggest that the use of a detection medium incorporating both glucose and maltose will result in increased ability to detect lactic acid bacteria. AS

123

[Biological degradation of acids in wines.]
Svejcar, V.
Vinohrad 16 (11) 257 (1978) [Cs] [Katedra Ovocnictvi a Vinarstvi VSZ, Lednice na Morave, Czechoslovakia]

Excessive acidity of wines is best dealt with by biological degradation of the malic acid; degradation is induced by malolactic fermentation bacteria, producing lactic acid and CO_2. The bacteria involved in the process are the heterofermentative Leuconostoc oenos and Bacillus tartarophtorum. Optimal conditions for propagation of the malolactic fermentation bacteria are approx. 18°C, and <50 mg free SO_2/l. STJ

124

Factors affecting the frequency of isolating Streptococcus agalactiae from herd milk supplies and the control of the organism in the dairy herd.
Pearson, J. K. L.; Pollock, D. A.; Greer, D. O.

British Veterinary Journal 135 (2) 119–129 (1979) [43 ref. En] [Dep. of Agric., Vet. Res. Lab., Stormont, Belfast, UK]

Incidence of Str. agalactiae in 51 herds (862 cows) in Northern Ireland was monitored for 1 yr by monthly culturing of bulk milk supplies. The number of occasions on which the organism was isolated varied from 0 (15 herds) to 12 (3 herds). Milk samples were obtained from 3400 quarters of the 862 cows; 233 cows were infected, with herd incidence of infected animals ranging from 0 to 87.5%. The overall infection rate was 27% of cows and 11.7% of quarters (33 and 16%, resp., when latent Str. agalactiae infections showing no cellular response were included). Frequency of herd isolations was significantly correlated ($P < 0.001$) with % quarters infected alone and plus latent infections and % cows infected alone, and ($P < 0.01$) with % cows infected plus latent infections. The limitations of monthly testing of herd bulk milk, and lack of standardized methods for monitoring Str. agalactiae in herds are discussed. CDP

125

Improvements in or relating to lactic acid bacteria.
Suzuki, T. (Ajinomoto Co. Inc.)
British Patent 1 543 098 (1979) [En]

A dried preparation of lactic acid bacteria was obtained by incubating a stock culture, concentrating by centrifugation, repeated washing with sterilized saline solution, suspending in different media (glucose, sodium alginate, casein solutions) and freeze-drying in ampoules. The cultures prepared from suspensions in 0.1% sodium alginate solution remained viable over 6 months and are claimed to be as suitable for assays of amino acids or vitamins as those preserved by conventional time-consuming and sophisticated methods. FL

126

Fermented milk product containing viable bifidobacteria.
Mutai, M.; Mada, M.; Nakajima, K.; Takahashi, S.; Nakao, T.; Shimada, K.; Iijima, T. (Yakult Honsha Co. Ltd.)
United States Patent 4 091 117 (1978) [En]

The properties of a strain of bifidobacterium, Bifidobacterium bifidum YIT-4005, are described. The strain may be used in the preparation of fermented milk products and is characterized by being acid resistant, aerobic and capable of being propagated in a pure milk medium without the addition of any growth promoting substance. Various examples of milk products prepared using this strain (e.g. fermented flavoured milk and cheese) are given. EJM

127

Concentrated dairy cultures: a study on the preparation, preservation and use of mesophilic mixed species lactic starter concentrates.
Pettersson, H.-E.
Dissertation Abstracts International, C 38 (1) 53: 32pp. (1977) [En] [Univ., Lund, Sweden]

This thesis was based on the following papers: studies on batch production of bacterial concentrates from mixed lactic starters; growth of a mixed lactic starter in a continuous 'pH-Stat' fermenter; preservation of mixed lactic starter concentrates by freezing and freeze-drying; and accelerated cheese ripening: a method for increasing the number of lactic starter bacteria in cheese without detrimental effects. AS

128

Potential application of microbial antagonism to extended storage stability of a flesh type food.
Raccach, M.; Baker, R. C.; Regenstein, J. M.; Mulnix, E. J.
Journal of Food Science 44 (1) 43–46 (1979) [22 ref. En] [Dep. of Poultry Sci. & Food Sci., Cornell Univ., Ithaca, New York 14853, USA]

The antagonism between lactic acid bacteria and spoilage and pathogenic bacteria was studied in ground and mechanically deboned poultry meat (MDPM). Resting cells of Lactobacillus plantarum (LAP, Lactacel DS), Pediococcus cerevisiae (PEC, Accel) or their 50:50 mixture were added to the meat. Addition of LAP or PEC at 10^8 cells/g to MDPM delayed time to spoilage at 3°C from 4 days to 5; LAP + PEC (2×10^8/g) delayed time to spoilage from 4 days to 6. Use of 10^9 cells/g gave an additional day of shelf life for LAP or PEC or their mixture (2×10^9/g). Shelf life of ground poultry meat at 3°C was increased from 8 days for control to 10 days for 10^9 LAP or PEC/g, and to 12 days for LAP + PEC mixture (2×10^9/g). Meat pH did not change during the storage period. Fluorescent psychrotrophs were present in control but not treated meat samples. Results are presented for growth of LAP or PEC in association with other bacteria in buffered brain heart infusion (BBHI) broth; PEC inhibited (i) Pseudomonas fluorescens and (ii) Ps. putrefaciens but not (iii) Ps. fragi, LAP repressed (i) and (iii) and impaired the colony forming ability of (ii) on standard methods agar. LAP totally repressed growth of (iv) Salmonella typhimurium in BBHI, as did PEC; similar results were obtained for (v) Staphylococcus aureus. Growth of (i)–(v) on agar plates in the presence of LAP or PEC was studied by the 'spot on the lawn' technique; both LAP and PEC showed zones of inhibition for (v), but for (v) only. Reasons for difference of these results from those in association broth culture are discussed, as is the principle of using LAB, PEC or their mixture in poultry and other meat products. DIH

129

[Lactic starters used in the meat processing industry]
Favre, C.; Ramet, F.
RTVA 16 (130) 19, 21 (1977) [4 ref. Fr] [Lab. de Microbiol., Clermont-Ferrand, France]

Studies were conducted on the bacterial flora of 27 samples of lactic starters for use in raw dry sausage products. Tables of results are given. Values for various groups of microorganisms included the following: total count (Eugon agar) 5–5 $\times 10^7$/g; total mesophile count 35–5.2 $\times 10^7$/g; lactobacilli 0–33 $\times 10^7$/g; faecal streptococci (13 samples positive) $\leq 5 \times 10^6$/g; sulphite-reducing anaerobic bacteria (9 samples positive) < 100/g; coliforms (20 samples positive) $\leq 5 \times 10^3$/g; and staphylococci (2 samples positive) $\leq 2.2 \times 10^2$/g. The low counts of lactobacilli and the poor hygienic quality of some of the starter preparations are criticized. AJDW

130

Streptococci. [Conference proceedings]
Skinner, F. A.; Quesnel, L. B. (**United Kingdom**, Society for Applied Bacteriology) (Editors)
Society for Applied Bacteriology Symposium Series No. 7, xiii + 415pp. (1978) [many ref. En]

This vol. is a collection of papers presented at this symposium, held during the Summer Conference at the University of Manchester in July 1977. Papers include: Streptococci as indicators in water supplies, by N. P. Burman, J. K. Stevens & A. W. Evans (pp. 335–347, 28 ref.). A further 5 papers are abstracted separately in FSTA and are listed in the author index under **United Kingdom**, Society for Applied Bacteriology [Series 7 Symposium]. SP

131

The control of spoilage and pathogenic microorganisms in poultry meat by lactic acid bacteria.
Raccach, M.
Dissertation Abstracts International, B 38 (11) 5263–5264: Order no. 78-06344, 200pp. (1978) [En] [Cornell Univ., Ithaca, New York 14850, USA]

Studies on the potential for use of lactic acid bacteria. (Lactobacillus plantarum and/or Pediococcus cerevisiae) for improvement of the shelf-life of refrigerated mechanically deboned poultry meat (MPDM) are described: effects of lactic acid bacteria on growth of Pseudomonas fluorescens, Ps. fragi, Ps. putrefaciens, Salmonella typhimurium and Staphylococcus aureus in Buffered Brain Heart Infusion broth, liquid pasteurized whole egg and cooked MPDM were investigated. Addition of lactic acid bacteria at 10^9/g was more efficient than addition at 10^8/g in prolonging the shelf-life of MPDM; a 50:50 mixture of L. plantarum and P. cerevisiae was more effective than either species alone. Addition of lactic acid bacteria prolonged shelf-life at 3° or 11°C by 1–2 days, and gave lower TBA values in stored samples. Psychrotrophic count of MPDM was reduced by a factor of 10 by addition of lactic acid bacteria. Inhibiting effects of the 2 lactic acid bacteria and their 50:50 mixture on the individual spp. of pathogenic and spoilage bacteria studied are discussed in detail. AJDW

132

[The significance of biological acid decomposition and its effect on the SO_2 requirement of wines.] Die Bedeutung des biologischen Säureabbaus und sein Einfluss auf den Schweflige Säure-Bedarf der Weine.
Mayer, K.
Weinwirtschaft 115 (9) 223–226 (1979) [De] [Eidgenössische Forschungsanstalt für Obst-, Wein- & Gartenbau, CH-8820 Wädenswil, Switzerland]

Biological acid decomposition (bacterial malo-lactic fermentation) of wines is discussed. Apart from malic acid, concn. of some other acids may be reduced; citric acid is almost completely eliminated, and concn. of gluconic acid, glutamic acid, glutamine, asparagine and arginine are considerably reduced. Tartaric acid concn. is, however, unaffected. Leuconostoc oenos gives the best results; Lactobacillus brevis and Lactobacillus plantarum give an off-flavour, and Pediococcus cerevisiae forms diacetyl, histamine, tyramine and phenylethylamine. Bacterial malo-lactic fermentation occurs spontaneously; Leuconostoc oenos grows preferentially at pH 3.1–3.3. As Leuconostoc oenos is very SO_2-sensitive, ≤20 mg SO_2/l. should be added. Malo-lactic fermentation reduces the SO_2 demand of the wine, concn. of SO_2-binding substances, e.g. acetaldehyde, pyruvic acid and α-ketoglutaric acid being low. TUB-IGB

133

Preliminary studies with coated-wire electrodes for malate, lactate and tartrate ions in model solutions.
Boulton, R.
American Journal of Enology and Viticulture 29 (4) 289–291 (1978) [3 ref. En] [Dep. of Viticulture & Enology, Univ. of California, Davis, California 95616, USA]

Electrodes of the coated-wire type were constructed for tartrate, malate and lactate ions. Responses of these unique electrodes in model solutions were determined. Their responses are not Nernstian and the mechanism of electric potential production is not completely understood. However, they offer a new approach to analyses related to bitartrate precipitation and malo-lactic fermentation in wines. AS

134

Report of the technical sub-committee on microbiological controls.
Helbert, J. R. (Chairman)
Journal of the American Society of Brewing Chemists 34 (3) 93–95; (4) 192 (1976) [6 ref. En]

Collaborative testing of Raka-Ray lactic acid bacteria medium (RRLM) compared with universal beer agar (UBA) is reported. RRLM yielded larger lactic acid bacterial colonies than UBA and also suppressed the growth of non-lactic acid, facultative bacterial colonies. Colony counts for lactic acid bacteria on RRLM were of the same magnitude as those on UBA. It is recommended that RRLM, with its known limitations specified, be included in the ASBC Methods of Analysis. JRR

135

[Lactic fermentation of red cabbage.] Milchsaure Vergärung von Rotkohl.
Liepe, H.-U.; Junker, M.
Industrielle Obst- und Gemüseverwertung 63 (13) 349–351 (1978) [4 ref. De] [Rudolf Müller Co., Giessener Strasse 14, D-6301 Pohlheim 1, Federal Republic of Germany]

Production of a new food product by lactic fermentation of red cabbage was investigated. Shredded red cabbage with 2% NaCl was allowed to ferment at 18°C, with or without inoculation with Lactobacillus plantarum (5×10^7 lactobacilli/g) and with or without 0.5% sucrose addition. pH, residual sugar, lactic, acetic and total acid and microbiological counts were determined after 1, 3, 7 and 12 days. Tabulated results and sensory evaluation by a tasting panel showed that best results were obtained with starter culture

inoculation and added sugar. The product had agreeable colour, flavour and texture. Prior blanching gave a poor quality product. RM

136

[The microflora of sour dough. VI. Amino acid requirements of lactic acid bacteria (genus Lactobacillus Beijerinck) from sourdoughs and sourdough starters.] Die Mikroflora des Sauerteiges. VI. Das Aminosäurebedürfnis der in "Reinzuchtsauern" und in Sauerteigen anzutreffenden stäbchenförmigen Milchsäurebakterien (Genus Lactobacillus Beijerinck).
Spicher, G.; Schröder, R.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 168 (5) 397–401 (1979) [7 ref. De, en]
[Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Schützenberg 12, D-4930 Detmold 1, Federal Republic of Germany]
See FSTA (1979) 11 8M887 for part V.

137

[Importance of 'sour dough yeasts' for sour dough fermentation.] Die Bedeutung der "Sauerteighefen" für die Sauerteiggärung.
Spicher, G.; Schröder, R.
Getreide, Mehl und Brot 32 (11) 295–301 (1978) [21 ref. De]

Effects of several different strains of yeast on the lactic acid fermentation of sour dough were investigated; these 'sour dough yeasts' were capable of proliferation in the temp. range 20–50°C, with an optimum at 35°C, and were acitive at pH between 3.6 and 5.6, while decreasing pH values shifted the optimum temp. towards the lower end of the range. Respiration of the yeast was more strongly influenced by acetic acid addition than by presence of lactic acid; dependent on the strain of Lactobacillus involved, the yeasts had either a stimulatory, inhibitory or neutral effect on fermentation. Studies of Lactobacillus brevis var. lindneri showed that in the presence of various yeasts (from 1–10% of the total counts), generation times were reduced by 10–30 min according to the strain of yeast concerned. BDH

138

Release of soluble and amino nitrogen in individual casein fractions by Lactobacillus mutants.
Jasjit Singh; Ranganathan, B.
Milchwissenschaft 34 (5) 288–289 (1979) [10 ref. En, de] [Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal, Haryana, India]

2 γ-radiation-induced mutants of Lactobacillus bulgaricus and L. casei, selected on the basis of increased proteolytic activity, were used to study the degradation of whole casein and fractions of casein at pH 5.0, 6.0 and 7.0. Soluble and amino N were determined in the casein substrates degraded with cell suspensions of lactobacilli. Max. liberation of both forms of N occurred at pH 7.0. However, γ-radiation-induced mutants released significantly higher amounts of soluble and amino N compared with the parent cultures. AS

139

Streptococci in the dairy industry. [Lecture]
Law, B. A.; Sharpe, M. E.
Society for Applied Bacteriology Symposium Series No. 7, 263–278 (1978) [many ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

The importance and use of lactic streptococci as starter cultures in the dairy industry is discussed. The utilization of milk proteins and lactose by lactic streptococci is described, and the effect of alternative pathways of carbohydrate metabolism on short-life fermented products (e.g. Cottage cheese) considered. The authors also review the influence of lactic streptococci on ripening and flavour development of cheese, mentioning off-flavours, factors affecting growth and acid production, and the formation of toxic amines in cheese by group D streptococci. The causes of slow growth in milk and the factors stimulating growth, e.g. addition of yeast extract to milk, are mentioned. [See FSTA (1979) 11 10C580] JMa

140

Nisin: its preservative effect and function in the growth cycle of the producer organism. [Lecture]
Hurst, A.
Society for Applied Bacteriology Symposium Series No. 7, 297–314 (1978) [many ref. En] [Health Protection Branch, Health & Welfare Canada, Ottawa, Canada]

The use of nisin as a food preservative is reviewed, with particular reference to its properties, and the technical and public health consideration in its use in food. The function of nisin and its synthesis in the growth cycle of Streptococcus lactis is discussed in detail. [See FSTA (1979) 11 10C580.] JMa

141

A study of the lactic acid bacteria from vacuum-packaged beef.
Baird, K. J.
Dissertation Abstracts International, C 38 (1) 52: 275pp. (1977) [En] [Queen's Univ., Belfast, UK]

The suitability of a number of media for the culture, selective enumeration and maintena nce of the lactic acid bacteria from vacuum-packaged beef was assessed. The relationship of the lactic organisms from vacuum-packaged beef to similar organisms from other sources was also assessed, using multipoint inoculation techniques to characterize some 450 such isolates and an Adansonian-type approach to group them. This resulted in 15 clusters. The Cluster Average Result Patterns of these facilitated their comparison with a similarly characterized selection of named strains of lactic acid bacteria. Results indicated that the majority of the isolates were most similar to Leuconostoc spp. The possible sources of lactic acid bacteria occurring in vacuum-packages of beef were examined. Lactic acid bacteria from various sites in an abattoir were compared with isolates which developed on beef vacuum-packaged at the same plant. Results suggested that a large proportion of the lactic flora of such meat consisted of organisms similar to those isolated from the abattoir environment, mainly the animal. The

remainder were unique to the flora of the vacuum-packaged beef. A number of the ecological factors thought to influence the development of the micro-flora of vacuum-packages beef were examined. CO_2 within the vacuum-packaged was found to be less important than O_2 concn. in producing a lactic flora. The inhibitory effects of lactic organisms in mixed culture were also studied. Finally, a representative selection of lactic organisms from vacuum-packaged beef was surveyed for their ability to cause proteolysis, lipolysis, dextran production and H_2O_2 production. Results suggested that a significant proportion were potential spoilers. AS

142

[Selective cultivation of enterococci from foods of animal origin.] Selektive Kultivierung von 'Enterokokken' aus Lebensmitteln tierischer Herkunft. [Lecture]
Reuter, G.
Archiv für Lebensmittelhygiene 29 (4) 128–131 (1978) [18 ref. De, en] [Inst. für Lebensmittelhygiene, Fleischhygiene & Tech., Freie Univ. Berlin, Brümmerstrasse 10, 1000 Berlin 33]

7 different media were tested over 10 yr with laboratory strains and in routine analyses for identification of enterococci and related species from meat and meat products. The following agar media (obtainable commercially as dry media) were tested: aesculin-bile-azide (ABA), kanamycin-aesculin-azide (KAA), citrate-azide-tween-carbonate (CATC) M-enterococcus (ME), thallous acetate (TA), streptococci-selective (ScS), crystal violet-azide (KA). There is no universally applicable medium, but CATC and KAA may be used for most purposes. CATC is fully selective for streptococci and for real enterococci, though other strains of streptococci may grow at reduced rate (e.g. S. bovis). KAA is insufficiently selective towards lactobacilli and a strain of Corynebacterium tested, which reduces its usefulness for foods with high lactobacilli counts. [See FSTA (1979) **11** 10C547.] RM

143

The antagonistic properties of lactobacilli against clostridia isolated from cheese, feed and manure.
Korhonen, H.; Ali-Yrkkö, S.; Ahola-Luttila, H.; Antila, M.
Meijeritieteellinen Aikakauskirja 36, 20–34 (1978) [26 ref. En] [Inst. of Dairy Sci., Univ., 00710 Helsinki 71, Finland]

In agar diffusion tests, 5 Lactobacillus strains (Lactobacillus acidophilus, L. bulgaricus, L. lactis and 2 L. helveticus) inhibited 42 of 45 clostridial strains isolated from Emmental cheese, but only 4 of 17 strains isolated from feed and 11 of 30 strains isolated from manure. L. bulgaricus had the strongest inhibitory effect and widest spectrum. Cl. tyrobutyricum (24 strains) was in general more vulnerable to inhibition than the other strains isolated from cheese (12 Cl. sporogenes, 5 Cl. bifermentans, 2 Cl. butyricum and 2 other Clostridium spp.). The inhibitory effect on spores was slightly weaker than the effect on vegetative cells. It is suggested that the inhibitory effect is due to antibiotic-like metabolites. ADL

144

Effect of membrane perturbing treatments on the membrane-bound peptidases of Streptococcus cremoris HP.
Exterkate, F. A.
Journal of Dairy Research 46 (3) 473–484 (1979) [17 ref. En] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

145

Ascorbic acid stimulation of diacetyl production in mixed-strain lactic acid cultures.
Richter, R. L.; Brank, W. S.; Dill, C. W.; Watts, C. A.
Journal of Food Protection 42 (4) 294–296 (1979) [20 ref. En] [Dep. of Anim. Sci., Texas A&M Univ. College Station, Texas 77843, USA]

Effect of 3 levels of ascorbic acid on diacetyl and acid production by 2 mixed-strain lactic acid cultures was investigated. Each culture was grown in dried skim-milk reconstituted to 11% TS with 0.1% added sodium citrate. Ascorbic acid concn. in the milk were 0, 0.10 or 0.25%. Stimulation of diacetyl production was observed at both concn. of ascorbic acid. The stimulatory effect of ascorbic acid at both concn. was approx. the same for each culture. Diacetyl production was initiated earlier in samples containing ascorbic acid. Ascorbic acid did not stimulate acid production. AS

146

[Quality of Sovetskii cheese produced under conditions of different levels of lactic and propionic acid fermentation.]
Ostroumov, L. A.; Babushkina, V. A.; Maiorov, A. A.; Govoryutkina, S. A.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 23, 100–104 (1978) [4 ref. Ru] [Altaiskii Filial Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, USSR]

Sovetskii cheese was made from the same batch of milk with 0.3% lactic starter (0.1% 'small cheese starter', 0.1% Streptococcus thermophilus and 0.1% Lactobacillus helveticus) with addition of 10 or 20% water in the vat. Water addition had no effect on the rate and extent of whey expulsion from the curd, but reduced acid production during manufacture and ripening. However, propionic acid fermentation was stimulated and the cheese had a more pronounced flavour, better consistency and better eye formation than control cheese made without water addition. FL

147

Lactic streptococcal bacteriophage enumeration. A review of factors affecting plaque formation. [Review]
Mullan, W. M. A.
Dairy Industries International 44 (7) 11, 13, 15 (1979) [27 ref. En] [Dep. of Dairy Tech., West of Scotland Agric. Coll., Auchincruive, Ayr, UK]

This paper reviews the major factors which influence plaque formation by lactic streptococcal phages, covering electrolyte requirements, use of indicator

strains in phage assays, growth phase of host, influence of plating medium, phage diluent, temp. and pH, and use of broth or milk-grown cells in phage assays. FL

148

Extracellular peptidases in group N streptococci used as cheese starters.
Law, B. A.
Journal of Applied Bacteriology 46 (3) 455–463 (1979) [16 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

Strains of Streptococcus cremoris which utilized peptides had a mercaptoethanol-sensitive, Mg^{2+}-activated dipeptidase which could be released from the cells by lysozyme. A similar enzyme was inferred to be present in Str. lactis. An apparently cell wall-bound peptidase was only found in Str. lactis; this was also Mg^{2+}-activated but was insensitive to mercaptoethanol. The peptidase recovered from culture supernatants of Str. cremoris and Str. lactis was similar to one of the two EDTA-sensitive intracellular dipeptidases present in both organisms, but was distinct from the lysozyme-released enzymes. The significance of these cell-bound extracellular peptidases in relation to peptide utilization is discussed. AS

149

Optimum cultural conditions for induction of temperate bacteriophages in lactic streptococci.
Meister, K. A.; Ledford, R. A.
Journal of Food Protection 42 (5) 396–400 (1979) [19 ref. En] [Dep. of Food Sci., Cornell Univ., Ithaca, New York 14853, USA]

19 strains of lactic-group streptococci were examined for lysogeny by treatment with UV light; 8 were inducible. The effectiveness of lysogenic induction with UV light or mitomycin C depended on the dose of inducing agent, temp. of incubation, and age of the culture. Strain-specific differences in responses to all of these factors were observed; however, in general induction was most effective at temp. of 30°C or less and when cultures were in mid-exponential growth. No single UV or mitomycin C dose would induce all 8 strains. Cultures which had been frozen and thawed were generally not inducible immediately after thawing. This was attributed to inhibition of bacterial growth by freezing. Cultures which had been chilled without freezing remained inducible. Lysogenic induction was not affected by either calcium or phosphate. AS

150

[Physiological and biochemical characteristics of lactic acid bacteria present in cheese starters.]
Gudkov, A. V.; Perfil'ev, G. D.; Matevosyan, L. S.; Dokukin, V. M.; Chepkova, V. I.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 21, 9–16 (1977) [2 ref. Ru] [VNIIMiSP, Uglich, USSR]

8 strains of Streptococcus lactis, 6 of Str. diacetilactis, 2 of Str. cremoris and 1 of Leuconostoc citrovorum were cultured in skim-milk (3% inoculum) at 30°C, and titratable acidity, pH, Eh, gas formation, O_2 consumption, and sensitivities to H_2O_2 and bacteriophages were determined. Best differentiation of acid formation was obtained after culturing for 6 h, when titratable acidities were 34–41°T for Str. lactis, 33–40°T for Str. diacetilactis, 34° and 36°T for Str. cremoris and 29°T for L. citrovorum. Addition to the milk of 0.25% chymosin enhanced acid formation, stimulation being as a rule greater with weak acid producers. All strains, except 1 of Str. lactis, absorbed O_2 during the 1st 4 h of incubation and formed CO_2. Str. lactis and Str. diacetilactis strains proved more resistant to H_2O_2 than the other strains tested. In tests with 46 types of bacteriophage, high sensitivity was shown by 2 strains of Str. lactis (65 and 37% of all phages), 1 strain of Str. diacetilactis (30%), and both strains of Str. cremoris (30%). SKK

151

[Microbiological determination of vitamin B_{12} in heat-treated foods.]
Hozova, B.; Sorman, L.
Prumysl Potravin 29 (9) 496, 529–530 (1978) [12 ref. Sk] [Chemickotech. Fak., Slovenska Vysoka Skola Tech., Bratislava, Czechoslovakia]

Pigs' liver was (i) cut into cubes and braised with a small amount of fat and water and 1% NaCl for 15 min, (ii) sliced and fried with 1% salt in a little fat for 5–10 min, or (iii) minced, filled into 0.5-kg cans and sterilized for 70 min at 121°C. Samples of pig longissimus dorsi muscle (LM) were (iv) prepared and braised as (i) for 30 min, or (v) fried as (ii) for 3 min, or (vi) salted, sliced and sterilized as (iii). Samples of beef LM were (vii) braised as (i) for 30 min, or (viii) fried as (ii) for 10 min, or (ix) sterilized as (vi). All tests were in triplicate on semi-industrial scale. Vitamin B_{12} contents were determined by the Lactobacillus leichmanii method. Mean values, with s.d., were (μg/100 g): pigs' liver, raw 2.06 ± 0.089, (i) 0.831 ± 0.037, (ii) 0.532 ± 0.051, and (iii) 0.442 ± 0.006; pork, raw 0.124 ± 0.001, (iv) 0.076 ± 0.006, (v) 0.066 ± 0.007, and (vi) 0.041 ± 0.006; and beef, raw 0.197 ± 0.008, (vii) 0.087 ± 0.011, (viii) 0.067 ± 0.007, and (ix) 0.057 ± 0.002. SKK

152

[Decontamination of hot beef carcasses with organic acids.] Dekontamination schlachtwarmer Rinderkörper mit organischen Säuren.
Snijders, J. M. A.; Schoenmakers, M. J. G.; Gerats, G. E.; Pijper, F. W. de
Fleischwirtschaft 59 (5) 656, 658, 660, 662–663; 509 (1979) [31 ref. De, en] [Rijksuniv., Biltstraat 172, Utrecht, Netherlands]

The effect of spraying hot beef carcasses with lactic acid or pH Liquid® (a commercial product with pH 1.25, sp. gr. 1.108, free acid 0.6 m-equiv./ml) on the surface bacterial counts was investigated. Sample areas were leg (M. biceps femoralis), breast (M. pectoralis profundus) and shoulder (M. triceps brachii). 0.5% lactic acid significantly reduced counts (total aerobes, Gram-positive and Gram-negative organisms) only on heavily contaminated surfaces (breast); 0.75% reduced counts on breast and leg and 1.0% reduced counts on all the

test areas by a max. of 2 log units/cm², depending on the degree of contamination. 5% pH Liquid® had hardly any effect, 20% was comparable to 0.5% lactic acid. The reductions in bacterial counts persisted during 3 days refrigerated storage. Greatest reductions were achieved by 10% lactic + 1% ascorbic acid. About half the samples examined for Enterobacteriaceae had counts greater than the limit of detection (log N/cm² > 1.3). The number of positive samples was significantly reduced by lactic acid at all concn., much less by pH Liquid®. Lactic acid at 0.5–1.0% caused no lasting colour changes after 3 days' cold storage; but 10% had a more lasting effect. The decontamination treatment must not be made an excuse for neglecting slaughtering hygiene. RM

153

Easy method detects juice dilution.
Vandercook, C. E.; Smolensky, D. C.
Food Product Development 13 (1) 60–61 (1979) [4 ref. En] [Fruit & Vegetable Chem. Lab., Sci. & Education Admin., USDA, Pasadena, California, USA]

Orange juice samples under 11 labels were purchased from 6 local supermarkets between April and Sept., 1977. The basic assay mixture was prepared from the orange juice concentrate by dilution to single strength, centrifugation, adjustment of the clear serum to pH 6.5, glucose addition and further dilution to yield a mixture containing 4% juice and 1% glucose. Aliquots of this were treated as follows: one set was held as a control, while the remaining sets were supplemented with yeast extract and the first and second growth-limiting nutrients (amino acids as acid hydrolysed casein, and Mn). After sterilization and inoculation with dil. saline suspension of Lactobacillus plantarum, the assay mixtures were incubated at 35°C for 30 h, then bacterial growth was measured as turbidity (absorbance at 550 nm). Relative absorbances and their ratios for retail frozen conc. orange juices are tabulated. Juice content can be estimated from any of the primary absorbance parameters or by averaging the estimated juice content calculated from several parameters. Using the absorbance ratios of control and supplemented mixtures helps detect adulterants more sophisticated than sugar, water and acid. VJG

154

Lactic fermentation of green mango slices in brine.
(In 'Proceedings of the First Indian Convention of Food Scientists and Technologists' [see FSTA (1979) 11 12A871].) [Lecture]
Maitra, R. K.; Chaudhuri, D. R.; Mitra, S. N.; Bose, A. N.
p. 98, No. 9.5 (1979) [En] [Jadavpur Univ., Calcutta, India]

Green mangoes (var. Arshina) were peeled and sliced, and the slices cured by dry-salting until tissue salt concn. reached 8–10, 13–15 or 19–20%. The cured slices were then subjected to lactic fermentation at 28–30°C for 120 days; samples withdrawn during fermentation were examined for overall quality and for contents of total acid, lactic acid and residual non-volatile acids after extraction of lactic acid. Slices containing 13–15% salt fermented for 120 days gave the most desirable end-product with high lactic acid and total acid contents. JA

155

[Application of induced mutagenesis of lactic streptococci in selecting aroma-forming starters for margarine.]
Shmeleva, L. I.; Fal'k, E. Yu.; Mikhailova, I. V.
Maslozhirovaya Promyshlennost' No. 1, 15–18 (1979) [4 ref. Ru] [VNIIZh, USSR]

The action of physical (γ- and UV radiation) and chemical (ethylenimine, nitrosomethylurethane) factors on lactic streptococci enables aroma-forming mutants to be selected. Industrially valuable mutants are used to ferment milk intended for margarine manufacture. Addition of diacetyl formers to starters producing aroma leads to higher quality of the starters used in margarine manufacture. STI

156

[Improvement of technology of bacterial preparation No. 2 for cheese.]
Belova, G. A.; Medvedeva, Z. P.; Kornelyuk, A. N.; Klimova, L. I.; Bratsilo, T. E.; Lymar', V. G.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 21, 16–21 (1977) [3 ref. Ru] [VNIIMiSP, Uglich, USSR]

Bacterial preparation No. 2 was made by culturing Streptococcus lactis, Str. cremoris, Str. diacetilactis and Str. paracitrovorus at 3.4% inoculum in a new medium (composition not stated), a neutralizing agent (preferably ammonia, or $NaHCO_3$ or NaOH) being added initially every 5–5.5 h, and later every 2–2.5 h. In fermentation of 500 l. batches, 2613 g biomass with 870 g DM were obtained, i.e. approx. twice as much as in the earlier procedure of culturing in whey medium. Total bacterial count was 366 000 million/g DM vs. 342 000 million/g; and titratable acidity reached in 2 h in milk with 1 g preparation added/l. was 37°T vs. 32°T. SKK

157

[Effect of bacterial concentrate on quality of cultured cream butter.]
Chuzhova, Z. P.; Belova, G. A.; Kornelyuk, A. N.; Klimova, L. I.; Medvedeva, Z. P.; Bratsilo, T. E.; Kuz'min, V. G.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 22, 37–41 (1978) [Ru] [VNIIMiSP, Uglich, USSR]

Extensive tests were carried out in butter factories in Altai region, Rostov region, Moldavian SSR and elsewhere on manufacture of cultured cream butter by batch churning, a dried bacterial concentrate developed in the Authors' Institute [see preceding abstr.] being used for starter production. The concentrate, obtained by culturing selected strains of Streptococcus lactis, Str. cremoris, Str. paracitrovorus and Str. diacetilactis in a new medium (details not specified), contained 150 000–400 000 million lactic acid bacteria/g, and at a 1 g/l. concn. increased titratable acidity of milk to 32–42°T after incubation for 2–3 h at 30°C. In comparison with cultured cream butters made with customary starter, butters made with the bacterial concentrate proved of even better quality; similar improvement was also found in industrial production of 11 000 t smetana. Because of its favourable effect on taste and aroma of

cultured cream butter and smetana and on smetana consistency, the bacterial concentrate is recommended for wide industrial use. SKK

158

Kinetic analysis of batch fermentation of yoghurt.
Reichart, O.
Acta Alimentaria 7 (4) 309–321 (1978) [14 ref. En] [Dep. of Food Tech. & Microbiol., Univ. of Hort., H-1064 Budapest, Izabella u. 46, Hungary]

In order to develop a continuous fermentation process for yoghurt, kinetic constants are first required for the batch process. Specific growth rate constants (k) were determined for 3 temp. (40°, 45°, 50°C) and 3 inoculum levels (1, 3, 5%). The mother culture (1:1 Streptococcus thermophilus/Lactobacillus bulgaricus) was prepared by incubation at 45°C for 2–2.5 h in sterilized milk, followed by storage at 5°C. Milk for inoculation was heated at 90–95°C for 15–30 min and cooled to 45°C. A 3-l. fermenter controlled at ±0.3°C, with a 200 rev/min stirrer, was used. Data are presented for each individual organism at time intervals from 0 to 210 min showing cell numbers by direct microscopical count, pH values (6.0 to 4.8), and product formation as acidity SH°. At 40°C, fermentation was diauxic with 1 or 3% inoculation but diauxic only with 1% inoculum at 45°C. At 50°C, pronounced morphological degeneration of cells occurred after 60–70 min. Specific growth rate coeff. k/min are given at 40° and 45°C for each inoculum. The k values are used for analysis of variance and show that differences are significant at 99% probability for organisms or inoculum level and at 95% between temp. Values of k are significantly higher for streptococci than lactobacilli, at 45° than at 40°C, and for 1% pinoculum rather than 3 or 5%. These k values are suggested for dilution rates in a continuous process. ELC

159

Grouping of lactic streptococci by gel electrophoresis of soluble cell extracts.
Jarvis, A. W.; Wolff, J. M.
Applied and Environmental Microbiology 37 (3) 391–398 (1979) [18 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Soluble cell proteins obtained from 35 strains of lactic streptococci [Streptococcus cremoris, Str. lactis, Str. diacetylactis and Str. thermophilus] were examined by gel electrophoresis. A mathematical analysis of the densitometer scans of the gels enabled strains to be grouped according to their overall similarity. Strains which were known to be variants of the same parent strain fell into the same group, supporting the validity of the method. It is suggested that strains which are alike according to their gel electrophoretic patterns when grown under standard conditions have an overall phenotypic similarity and that this indicates a similarity in genotype. The relevance of this to selection of strains of lactic streptococci for cheesemaking is discussed. AS

160

Antimicrobial activity of lactic cultures: partial purification and characterization of antimicrobial compound(s) produced by Streptococcus thermophilus.
Pulusani, S. R.; Rao, D. R.; Sunki, G. R.
Journal of Food Science 44 (2) 575–578 (1979) [15 ref. En] [Dep. of Food Sci. & Tech., Alabama A&M Univ., Normal, Alabama 35762, USA]

Skim-milk fermented by various lactic cultures was tested for antimicrobial activity by agar diffusion technique, using Pseudomonas fluorescens, P. aeruginosa and Bacillus subtilis as test organisms. Lactobacillus bulgaricus, L. acidophilus and Streptococcus thermophilus strongly inhibited the growth of the test organisms. Other lactic cultures, singly or in combination, showed varying degrees of antimicrobial activity. A methanol-acetone (M-A) extract was prepared by lyophilizing Streptococcus thermophilus-fermented milk and extracting the powder sequentially with cold methanol and acetone. The M-A extract strongly inhibited the growth of B. subtilis, B. pumilus, P. aeruginosa, P. fluorescens, Flavobacterium capsulatum, Salmonella typhimurium, Escherichia coli, Shigella sp. and Streptococcus lactis. The antimicrobial activity of S. thermophilus was not reported in the literature previously. The M-A extract contained ninhydrin-positive materials and did not lose antimicrobial activity even when it was exposed to a temp. of 100°C for 10 min. Five ml of M-A extract were applied to 20 × 2.2 cm Sephadex G-10 column equilibrated with 0.05N HCl which later served as the eluant. Fractions of 15 ml were collected at a flow rate of 2.5 ml/min. Sephadex fractionation of M-A extract showed that there were at least 3 active fractions. One of the fractions appeared in the void vol. followed closely by the other fractions indicating that the latter 2 fractions have compounds of mol. wt. <700 daltons. The purification achieved was about 400-fold. The activity (recovery) of the compound(s) increased upon fractionation on Sephadex indicating the possible presence of inhibitor(s). IFT

161

An agar medium and a simple streaking technique for the differentiation of the lactic streptococci.
Mullan, M. A.; Walker, A. L.
Dairy Industries International 44 (6) 13, 17 (1979) [5 ref. En] [West of Scotland Agric. Coll., Dep. of Dairy Tech., Auchincruive, Ayr, UK]

The differential medium contains (per l. distilled water) 10.0 g sodium carboxymethyl-cellulose, 5.0 g yeast extract, 5.0 g phytone peptone, 5.0 g Lab Lemco, 1.5 g lactose, calcium citrate, L-arginine hydrochloride, 5.0 g polypeptone, 15.0 g agar and 2 ml 0.1% bromocresol purple. Up to 6 strains of lactic streptococci may be tested per 90 mm plate of medium, parallel streaks of culture being applied to the plate with a min. distance of 10 mm between streaks. Reactions after incubation at 30°C for up to 48 h are as follows: Streptococcus cremoris strains produce yellow colonies with no clearing; Str. lactis strains give purple colonies with no clearing; and Str. diacetilactis strains show purple colonies with extensive clearing of the medium due to citrate utilization. JMa

162

[Production of long-life yoghurt.]
Stoyanov, S.; Obretenova, S.; Panova, V.; Andreinski, A.; Radulov, R.; Dimitrova, M.
Izvestiya Nauchnoizsledovatelski Institut po Mlechna Promishlenost 8, 45–67 (1978) [11 ref. Bg, ru, en] [Nauchnoizsled. Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

Using milk with 3.6–3.8% fat and of 18–20°T titratable acidity and a Streptococcus thermophilus/Lactobacillus bulgaricus (2:1) starter, yoghurt was made in the following variants: (i) customary procedure, (ii) with addition of 2% dried skim-milk, (iii) with addition of 3% spray-dried ultra-filtered milk, (iv) with addition of 10% fruit syrup and 0.8% gelatin, (i)–(iv) preparations being packaged in 250-g hemertically sealed glass containers and stored at 5°, 10°, or 15°C for up to 42 days, (v) according to Netherlands Patent 6 818 436, a 20-h culture of yoghurt starter being sprayed on the walls and bottom of 400-g glass containers at 3% of the milk, the containers being then filled with milk at 86–90°C, hermetically sealed, cooled to 45°C, held at 42°C until coagulation, and gradually cooled to 10–12°C, and (vi) pasteurizing milk at 90°C for 20–30 min, cooling to 42°C, adding 1% starter, coagulating in bulk to pH 4.1, stirring, plate-pasteurizing at 74–76°C for 30 s, and filling into 400-g glass containers, (v) and (vi) being stored at 18–22°C or 8–10°C for 28–42 days. All variants were examined at intervals during storage, pH, titratable acidity, microbiological examination and organoleptic tests being carried out. The results are tabulated or graphically presented in detail. The main conclusions were: (i)–(iv) stored in dark at 5°C remained fully suitable for consumption for 4 wk after manufacture, corresponding storage lives at 10° and 15°C being resp. 1 wk and 2–3 days; Str. thermophilus contents declined in (i)–(iv) during storage more rapidly than those of L. bulgaricus; (v) had a storage life of approx. 3 wk at 18–20°C and of 4–5 wk under refrigeration, but had less pronounced taste and aroma and lower quality than customary yoghurt; and (vi) had a storage life of >6 wk when packaged aseptically, and of <10 days when packaged under customary conditions. It is thought that as 99.99% of the lactic acid flora was destroyed in (vi) by the final pasteurization, it must be considered as a less valuable, preserved product. SKK

163

An electrophoretic study of peptidases in starter streptococci and in Cheddar cheese.
Cliffe, A. J.; Law, B. A.
Journal of Applied Bacteriology 47 (1) 65–73 (1979) [21 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, UK]

A modified electrophoretic starch gel technique was developed and applied to detection of peptidase acitivity in zymograms of crude extracts of Group N streptococci and extracts of cheese made with these organisms. The method required only 0.36 mg of peptide substrate for each test. Dipeptidase, tripeptidase and aminopeptidase activities were detected in strains of Streptococcus cremoris and Strep. lactis and in curds and cheeses, made with these organisms. Intracellular and extracellular fractions of Strep. lactis showed similar peptidase activity but with Strep. cremoris there were fewer peptidases in extracellular fractions. The peptidase composition of curd and cheese extracts of different ages was dependent upon the strain and sp. of starter streptococcus used in making the cheese. AS

164

The morphology of six bacteriophages of Streptococcus thermophilus.
Accolas, J.-P.; Spillmann, H.
Journal of Applied Bacteriology 47 (1) 135–144 (1979) [21 ref. En] [Lab. für Milchwissenschaft, Eidgenössische Tech. Hochschule Zürich, Eisgasse 8, CH-8004 Zürich, Switzerland]

The morphology of 6 phages of Streptococcus thermophilus, isolated in France from Gruyere cheese whey or yoghurt, was studied. They belong to Bradley's Group B and appear very similar. They possess a regular 6-sided head (size, 49–53 nm), of which the 3-dimensional structure is probably octahedral. The fairly long, non-contractile tails (length, 200–224 nm; width, 8–9 nm) are flexible and regularly striated. They appear to be the juxtaposition of 60–63 annuli packed one above the other and are assumed to contain 240–252 capsomeres. In one preparation rare short-tailed particles (tail length 130 nm) were also found. The tails have a terminal structure appearing either as a small plate, sometimes with a brush-like appearance, or a plate with short prongs provided, in 5 out of the 6 phages studied, with a more or less long central fibre. AS

165

Process for the treatment of meat with compositions including Micrococcus varians and a lactic acid producing bacteria.
Gryczka, A. J.; Shah, R. B. (Microlife Technics Inc.)
United States Patent 4 147 807 (1979) [En]

An improved process for producing a superior flavour in fermented meat, particularly sausage, using Micrococcus varians in admixture with Pediococcus cerevisiae NRRL-B-5627 and/or with other lactic acid producing meat fermenting bacteria for lowering the pH is described. M. varians is a very poor producer of lactic acid and alone cannot produce acceptable sausage. The improved bacterial compositions develop the solid bright red colour associated with sausage and other fermented meats in the presence of edible nitrate and/or edible nitrite. No acid forming chemicals are used in the fermentation process. The bacterial composition is preferably provided in the form of a frozen cell concentrate for storage and subsequent thawing for use. AS

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FAB 31

LACTIC ACID BACTERIA IN BEVERAGES AND FOOD

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H. BROOKES

EDITOR

1

Protein-rich nutrient.
Sorg, E.
UK Patent Application 2 004 555A (1979) [En]
A protein-rich nutrient material is obtained from cellulose-containing materials by hydrolysis, followed by lactic acid fermentation of the hydrolysate. IFT

2

[Cheese-like food.]
Fuji Oil Co. Ltd.
Japanese Examined Patent 5 401 784 (1979) [Ja]
A cheese-like food is prepared by subjecting a butyric acid ester and natural fat to transesterification. The esterified product is then mixed with solid milk components to yield an emulsion which is fermented in the presence of Streptococcus lactis. IFT

3

[Malolactic flora of some Central Italian wines.]
Rossi, J.; Costamagna, L.; Clementi, F.
Annali della Facolta di Agraria, Universita degli Studi di Perugia 32 (1) 185–196 (1977/1978) [23 ref. It, en, fr] [Istituto di Microbiologia Lattiero-Casearia, Facolta di Agraria, Perugia, Italy]
A study was made of the malolactic flora of (unspecified) wines from Central Italy which had shown spontaneous fermentation. All the strains isolated were Gram-positive, catalase-negative, were able to develop in must and produced lactic acid from L-malic acid. They could be divided into 3 groups: *Leuconostoc oenos* (including 2 variants); *Pediococcus cerevisiae;* and *Lactobacillus casei* subsp. *alactosus.* HBr

4

Optimization of lactic acid fermentation of frozen vegetable process wastes: model systems for producing animal feeds.
Moon, N. J.
Journal of Food Science 44 (5) 1460–1465 (1979) [18 ref. En] [Dep. of Food Sci., Univ. of Georgia Exp. Sta., Experiment, Georgia 30212, USA]

5

[Zucchini – a new high-value raw material suitable for processing.]
Elkner, K.
Zywienie Czlowieka 5 (3) 193–196 (1978) [4 ref. Pl] [Inst. Warzywnictwa w Skierniewice, Poland]
This paper includes detailed data for the composition of the zucchini var. *Nana Verde* and *Striata Nana,* and data for the DM, sugar, vitamin C and pectin contents of the processing var. Elite, Hybride Zucchini, Sterr's Green and Seneca Prolific. Lactic fermentation of zucchini shows the standard pattern; after 3 months, the brine reaches pH 3.0–3.6, with a lactic acid content of 0.80–0.85%. Because of their considerable pectin decomposition during fermentation, zucchini are only suitable for preparation of products intended for relatively short storage before use. Of the var. studied, Elite and Sterr's Green gave the highest quality pickled products (organoleptic scores of 3.7 and 4.0 resp. on a 5-point scale). IN

6

[Serological assay of group B streptococci antigen in herd milk.] Serologischer Nachweis von B-Streptokokken-Antigen in Herdensammelmilch.
Wiesner, H.-U.
Archiv für Lebensmittelhygiene 30 (2) 46–48 (1979) [3 ref. De, en] [Inst. für Hygiene & Tech. der Milch der Tierärztlichen Hochschule, Bischofsholer Damm 15, 3000 Hannover, Federal Republic of Germany]
A serological method of identifying group B streptococcal antigens by counter immunoelectrophoresis (CIE) is described and its advantages discussed. Preliminary tests of 1231 milk samples from herds in the Hanover area gave 13.6% positive B-antigen reactions by CIE. The results were independent of the critical number of the somatic cell count (500 000/ml) and of the bacteriological quality of the milk sample (determined by total count on plate count agar). Further studies on 617 samples from herds with >30 cows resulted in 20% positive reactions from 450 samples containing <250 000 somatic cells/ml. A regional and seasonal accumulation of group B Streptococcus is suggested. Legal aspects of the findings are discussed. [From En summ.] RM

7

[Variability of lactic acid bacteria caused by aflatoxin B_1 and its importance to manufacture.]
Sutic, M.; Banina, A.
Mljekarstvo 29 (5) 106–111 (1979) [21 ref. Sh] [Poljoprivredni Fak., Belgrade, Yugoslavia]
Aflatoxin B_1 (AB_1) produced by Aspergillus flavus MP_1 and checked spectrophotometrically and by a biological test was used in this study. The toxin affected the morphology and physiology of lactic acid bacteria, the effect depending on bacterial strain, aflatoxin concn. and duration of its action. With Lactobacillus helveticus, AB_1 increased and with L. casei in some cases slightly decreased the width of the cells, whilst in cells of L. bulgaricus it caused elongation of the cells, thickening of the chains in parts and formation of granules. Streptococcus lactis and Str. thermophilus formed longer chains, some cells showing thickening, in the presence of AB_1. The toxin increased acid production in L. helveticus but decreased it in L. casei, In mixed cultures of L. bulgaricus and Str. thermophilus and in a yoghurt starter the presence of 15–50 µg AB_1/ml retarded milk coagulation by 90–105 min in relation to AB_1-free controls. FL

8

Acid-producting activity of lyophilized lactic streptococcal cheese starter concentrates.
Yang, N. L.; Sandine, W. E.
Journal of Dairy Science 62 (6) 908–915 (1979) [13 ref. En] [Dep. of Microbiol., State Univ., Corvallis, Oregon 97331, USA]
Freeze-dried concentrates of lactic streptococcal starter bacteria (single and mixed strains) were tested

for survival and acid-producing activity after storage for up to 1 yr. Acid production was measured during incubation at 30°C for up to 6 h and 22°C for up to 18 h. Lyophilization media included (i) 11% skim-milk, (ii) skim-milk containing 15% sodium glycerophosphate, (iii) skim-milk containing 10% maltose, and (iv) sucrose-peptone (10%–5%) solution. Storage conditions included vacuum-sealing and storage under atmospheres of air, A, CO_2 or N_2. Best results were with commercial mixed strain starter cultures, of unknown strain composition, which were purchased as direct vat set Cheddar cheese starters. Freeze-dried concentrates of these cultures were active and stable at 25°C for several months when vacuum-sealed and stored in amber containers filled with A and when lyophilized in medium (ii). Freeze-dried concentrates of 10 such cultures when stored for 5–8 months at 25°C produced an average % titratable acidity of 0.97 (range 0.86–1.03) at 22°C in 18 h when inoculum was made into steamed (95°C for 40 min) skim-milk; when incubated at 30°C for 6 h, the average was 0.60% (range 0.35–0.80%) for freeze-dried concentrates stored 3–4 months. The apparent enhanced acid production by rehydrated concentrates incubated at 22° vs. 30°C suggests that such preparations may have greater application for direct inoculation of bulk starter milk than for cheese vat milk. AS

9

[Phage-resistant starter.]
Krylova, V. P.; Kononovich, N. G.; Zykova, N. E.
Molochnaya Promyshlennost' No 3, 19–20 (1979) [2 ref.] [Ukrainskii Nauchno-issled. Inst. Myasnoi i Molochnoi Promyshlennosti, USSR]

Bacteriophages isolated in dairy plants in the Ukrainian SSR were used in the screening of 90 strains of various types of mesophilic streptococci obtained from a culture collection. A new streptococcal starter composed of phage-resistant strains (Bukovina starter) with Streptococcus cremoris as the major acid-producing flora, is suitable for cheese varieties with low-scalding temp. (≤39°C). Since its introduction in May 1978 the use of the starter has increased rapidly and some 40 Ukrainian cheese plants are successfully employing it at present. FL

10

Heterolactic fermentation by 'homolactic' starter streptococci resulting from growth with limiting carbohydrate.
Thomas, T. D.
New Zealand Journal of Dairy Science and Technology 14 (1) 12–15 (1979) [9 ref. En] [Microbiol. Res. Establishment, Porton Down, Salisbury, UK]

Using the experimental procedure described in Journal of Bacteriology (1979) 138 (1) 109–117, 3 strains of Streptococcus lactis (ML_3, H_1 and ML_8) and 3 of Str. cremoris (AM_2, 158 and 266) were grown in chemostat cultures in which either glucose or lactose were limiting in the incoming medium. The dilution rate was kept constant until cultures were in equilibrium, and was then lowered in order to obtain a series of cultures growing at different rates with carbohydrate limitation. All strains were homolactic at the fastest growth rate. At lower dilution rates, <20% of glucose was converted to L-lactate by 5 of the strains, the exception being Str. lactis ML_8 which converted approx. 85% of glucose to L-lactate at a dilution rate of 0.06/h (corresponding to a mean generation time of 11.5 h). Str. lactis ML_3 and H_1 showed a substantial change in end-products at a dilution rate of 0.4/h, whereas at this dilution rate the Str. cremoris strains were still essentially homolactic. Products formed instead of L-lactate were formate, acetate and ethanol in mole ratios of approx. 1.0:0.7:0.6. These results indicate that lactic streptococci have the potential to carry out what may be undesirable fermentations, but whether these are of importance in the development of off-flavours in fermented milk products is not known. MEG

11

Thermograms of Streptococcus thermophilus and Lactobacillus bulgaricus in single and mixed culture in milk medium.
Monk, P. R.
Journal of Dairy Research 46 (3) 485–496 (1979) [13 ref. En] [Thermochem. Lab., Chem. Cent., Univ. of Lund, Lund, Sweden]

Application of microbial thermograms to evaluation of the performance of mixed cultures was investigated using a flow calorimeter connected to a 1-l. fermenter. In single culture, L. bulgaricus produced 48% more heat during 9 h at 37°C than did Str. thermophilus. In mixed culture, heat produced was approx. 75% of the sum of heat produced by the single cultures, and was essentially constant and independent of culture composition. Max. heat effect occurred at L. bulgaricus/Str. thermophilus ratio of 3.8:1; the amount of inoculum influenced duration of lag phase but not max. heat effect or amount of heat produced. When pH was maintained at 6.5, L. bulgaricus showed a 21% increase in heat production and a 30% increase in max. heat effect, but Str. thermophilus showed no significant increase over values obtained without pH control. The possibility of using this calorimetric technique when selecting strains to be incorporated into mixed cultures is discussed. CDP

12

[Methods for rapid differentiation of Streptococcus thermophilus from faecal streptococci.]
Ottogalli, G.; Galli, A.
Industria del Latte 15 (2) 61–72 (1979) [6 ref. It] [Istituto di Microbiol. Agraria, Univ., Milan, Italy]

13

[Lactobacillus acidophilus strain K_3III_{24} for production of dried dietetic soured milk products.]
Lukovnikova, L. A.; Koroleva, N. S.; Denisova, V. A. **(Union of Soviet Socialist Republics,** Sibirskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Molochnoi Promyshlennosti)
USSR Patent 639 940 (1978) [Ru]

This strain is held in the Siberian and Moscow branches of the All-Union Research Institute for the Milk Industry. The optimum growth temp. is 37–45°C

and acidity after 16 h cultivation in sterile milk is 175–180°T, max. acidity reached being ≤400°T. The increase in acidity is rapid, rising to 135–140°T after 6 h in milk with 3% inoculum. Glucose, arabinose and lactose are fermented, but not raffinose, sucrose, maltose or mannitol. Coliforms are inhibited completely in liquid medium containing 1/32 dilution of the lactobacillus culture and growth retarded at 1/128 dilution. Inhibition zones of ≤5 mm occur on a solid medium. Compared with known strains of L. acidophilus, the strain has enhanced resistance to spray drying conditions, making it possible to obtain dried preparations with an increased content of viable cells and to ensure a higher acidification rate and product quality. W&Co

14

Improved enumeration of lactic acid streptococci on Elliker agar containing phosphate.
Barach, J. T.
Applied and Environmental Microbiology 38 (1) 173–174 (1979) [5 ref. En] [Ind. Products Group, Miles Lab. Inc., Elkhart, Indiana 46515, USA]

Enumeration of lactic acid streptococci from dairy starter cultures on Elliker agar was improved by the addition of 0.4% (w/v) diammonium phosphate. Agar plate counts were up to 7.75 × greater due to improved buffering by the phosphate salt. AS

15

[*Streptococcus cremoris* strain with antagonistic properties.] (In *"Intensifikatsiya Protsessov Proizvodstva Natural'nykh Syrov i Sovershenstvovanie ikh Tekhnologii"* [see FSTA (1980) 12 1P109].) [Lecture]
Denisova, V. A.; Lukovnikova, L. A.
pp. 31–33 (1977) [3 ref. Ru] [Sibirskii Filial VNIMI, Omsk, USSR]

In a search for suitable starter components, some 200 strains of lactic streptococci (including *Str. lactis, Str. cremoris,* and *Str. acetoinicus)* were examined for antibiotic activity against coliforms prevalent under milk processing conditions [see FSTA (1977) 9 1P28]. *Str. cremoris* strains proved most promising in this respect, particularly strain $26B_3$. It showed marked acid formation (70–80°T after culturing for 6 h at 3% and marked inhibitory effect on *Escherichia coli, Enterobacter aerogenes, Citrobacter freundii* and *Str. faecalis;* unlike other spp. of lactic streptococci, it did not inhibit other starter components. Strain $26B_3$ proved its worth in commercial tvorog production and is recommended for commercial use, particularly in cheesemaking for inhibition of extraneous microflora during milk coagulation. SKK

16

[Proteolytic and lipolytic activities of lactic acid bacteria isolated from cheese.] (In *"Intensifikatsiya Protsessov Proizvodstva Natural'nykh Syrov i Sovershenstvovanie ikh Tekhnologii"* [see FSTA (1980) 12 1P109].) [Lecture]
Magak'yan, T.; Chitchyan, M. I.; Grushina, E. V.
56–60 (1977) [12 ref. Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

10 strains of lactic streptococci isolated from ripe, high-quality Chanakh cheese were cultured for 48 h at 37°C in hydrolysed milk; the culture medium was centrifuged for 20 min at 5000 rev/min and the supernatant was Seitz-filtered (1st filtrate); the residue was ground with sand to disrupt the bacterial cells, centrifuged as above, and the supernatant liquid Seitz-filtered (2nd filtrate). Proteolytic (casein substrate) and lipolytic (milk fat substrate) activities of the extracellular enzymes in the 1st Seitz-filtrate and of intracellular enzymes in the 2nd filtrate were determined. It is concluded from tabulated results that all 10 strains exhibited proteolytic and lipolytic activities; and that intracellular proteinases were more active than extracellular proteinases while the opposite was true for lipases. Some particularly proteolytically or lipolytically active strains are recommended for different cultured products. SKK

17

[Selection of strains for bacterial starter for smoked Kabardinskii cheese.] (In *"Intensifikatsiya Protsessov Proizvodstva Natural'nykh Syrov i Sovershenstvovanie ikh Tekhnologii"* [see FSTA (1980) 12 1P109].) [Lecture]
Dilanyan, Z. Kh.; Pazov, V. K.
pp. 34–37 (1977) [5 ref. Ru] [Erevanskii Zoovet. Inst., Erevan, USSR]

40 strains of lactic acid bacteria examined for suitability for production of smoked Kabardinskii cheese, 19 were selected and combined into 2 starter mixtures for tests in a cheese factory in the Kabardino-Balkar ASSR, the Uglich starter serving as control. Data on protein degradation and development of lactic acid microflora in the 3 types of cheese are tabulated. It is concluded that the starter variant consisting of strains 18, 43, 204, 617 and 2419 of *Streptococcus lactis,* strain 1507 of *Str. diacetilactis,* strains 1802 and 1888 of *Lactobacillus lactis,* mutant 7/1 strain of *L. casei* and mutant 5/3 strain of *L. helveticus* was best, selection being confirmed by organoleptic tests on the respective cheeses. The new starter is recommended for industrial use in this cheese factory. SKK

18

Fate of pathogens inoculated onto vacuum-packaged sliced hams to simulate contamination during packaging.
Stiles, M. E.; Ng, L.-K.
Journal of Food Protection 42 (6) 464–469 (1979) [33 ref. En] [Fac. of Home Economics, Univ. of Alberta, Edmonton, Alberta T6G 2M8, Canada]

Ham and chopped ham from 2 manufacturers were contaminated with 5 enteropathogens: Bacillus cereus, Clostridium perfringens, Escherichia coli, Salmonella typhimurium and Staphylococcus aureus, at time of slicing and vacuum-packaging, to simulate contamination by manufacturer. Subsequent treatment of the samples, representing sound and undesirable retail handling and consumer use conditions, indicated marked differences in the fate of the pathogens between these products and within product type between the 2 manufacturers. Greatest differences were observed between the chopped ham products. All pathogens,

except C. perfringens, grew actively in fresh ham and chopped ham with abusive holding at 30° and 21°C. After storage at 4° or 10°C for 30 days, B. cereus and C. perfringens were no longer detected, even after subsequent holding at 30° or 21°C for 24 h. E. coli survival and growth was variable. S. typhimurium survived well and grew under some conditions and S. aureus was generally inhibited at high levels of competition. AS

19

Effects of some spices on acid production by starter cultures.
Zaika, L. L.; Kissinger, J. C.
Journal of Food Protection 42 (7) 572–576 (1979) [23 ref. En] [E. Regional, Res. Cent., Philadelphia, Pennsylvania 19118, USA]

Ginger, red pepper, mustard, mace, cinnamon and clove were examined to determine their effects on growth of and acid production by a starter culture containing Lactobacillus plantarum and Pediococcus cerevisiae in a liquid medium. At 4, 8, and 12 g/l. levels all spices except clove stimulated acid production by the starter bacteria but did not stimulate increases in bacterial population. Clove was inhibitory to the starter bacteria at and above the 4 g/l. level, but low concn. (0.5–2.0 g/l.) stimulated acid production. High concn. of cinnamon (8 and 12 g/l.) delayed acid production, but bacterial counts were similar to those of the control. AS

20

Use of deep fat fried components in the formulation of dehydrated convenience foods. (In *'Fats and oils in relation to food products and their preparations'* [see FSTA (1980) 12 2N67].) [Lecture]
Bhatia, B. S.
pp. 60–64 (1978) [9 ref. En] [Defence Food Res. Lab., Mysore, India]

Since fat or oil is a major component of several Indian type of dishes, fat fried items can, with advantage, be used in the preparation of dehydrated convenience foods in preference to hot air dehydrated components which suffer from limitations like prolonged drying times, inferior texture and undesirable rehydration properties. Work covering standardisation of pretreatments and optimum drying and frying conditions of various components with the object of retaining acceptable colour, flavour and texture and also their formulation into dehydrated convenience foods with good shelf life is discussed. AS

21

Production of protein-rich extracts.
Moebus, O.
British Patent 1 543 463 (1979) [En]

The method comprises simultaneously culturing an autolysing yeast (*Saccharomyces cerevisiae)* and lactic acid bacteria (e.g. yoghurt bacteria) in a protein- and carbohydrate-containing product, such as whey, whey/bran mixture, skim milk, soy protein etc. so that the yeast at least partially breaks down the proteins and the bacteria at least partially break down the carbohydrates to produce lactic acid. After the breakdown of proteins, yeast cells and lactic acid bacteria may be removed and the liquid aerobically fermented. A protein-rich extract of a high nutritional value and low carbohydrate content is finally obtained which is useful as an additive to foods. FL

22

[Rapid preparation of dough using concentrated lactic acid starter.]
Sharenko, A. S.; Mukhina, T. D.; Sverdlova, L. P.; Beganskaya, L. S.; Yukish, M. G.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 4, 16–17 (1979) [Ru] [VNIIKhP, USSR]

The new method relies on the conc. lactic acid starter and batch-type R3-KhTZ (TPI) kneader; the colloidal, microbiological and biochemical processes taking place during fermentation and ripening of dough are intensified; the process is enhanced by more vigorous mechanical working, adjusting the pH to an optimal level using the lactic acid of biological origin, higher addition of yeast (by 0.8–1%) and somewhat higher dough temp. (32–34°C). Kneading and the conc. lactic acid starter are factors affecting dough rheology and the taste and aroma of the finished products. The total dough process takes 5–6 h. Quality of products made by the rapid method is almost identical with that of control products made using standard methods. STI

23

The application of the luciferin-luciferase reaction in estimating viable cells of dairy cultures.
Ryan, J. J.; Cardwell, J. T.; Childers, G. W.; Kellogg, T. F.; Wang, A. W.
Journal of Dairy Science 62 (suppl. 1) 206 (1979) [En] [Mississippi State Univ., State College, Mississippi 39762, USA]

ATP from actively growing cultures of *Streptococcus thermophilus* at 41.1°C was extracted by sonication in 20mM tris and 2 mM EDTA at pH 7.75 at 2 h incubation intervals. Its light emission in the luciferin-luciferase reaction was measured in a scintillation counter and compared with a standard curve. An increase in ATP was indicated by an increase in counts from 2×10^2 at 0 h to 6×10^4 at 6 h, reflecting an increase in viable cell count. In the same time, acidity developed from 0.0 to 0.41% and standard plate count (SPC) from 9.2×10^6 to 4.7×10^7 cells/ml. The method is suggested as an alternative to SPC for viable counts in, e.g., sweet acidophilus milk. JMa

24

Swiss cheese made with whey-based, pH controlled lactic cultures.
Jonas, L. L.; Hong, G. L.; Richardson, G. H.
Journal of Dairy Science 62 (suppl. 1) 69–70 (1979) [En] [Utah State Univ., Logan, Utah 84321, USA]

Streptococcus thermophilus strains were grown in milk and whey based medium (WBM) at pH 6–6.2. There was minimal change of activity after propagation on WBM for 6 days; inoculum was reduced from 0.7 for milk to 0.1 for whey. Cheese flavour and body were normal. Mean and s.d. of the 24 h pH of the cheese was 5.29 ± 0.095 with milk and 5.31 ± 0.096 with WBM culture. ASe

25

The production of free fatty acids in Swiss cheese.
Paulsen, P. V.; Kowalewska, J.; Hammond, E. G.; Glatz, B. A.
Journal of Dairy Science **62** (suppl. 1) 51 (1979) [En] [Iowa State Univ., Ames, Iowa 50010, USA]

Changes were made using an aseptic vat technique with ripening under an atm of CO_2; *Streptococcus thermophilus* and/or *Lactobacillus bulgaricus* and/or *Propionibacterium shermanii* (with gluconolactone to achieve pH control) were used. Fatty acids with chain length ≥C4 were released in all cheeses containing *P. shermanii* and *L. bulgaricus*. The organism used in the cheese production had relatively little influence on the neutral volatiles that were produced. DMK

26

Flavor and texture development in Latin American white cheese.
Torres, N.; Chandan, R. C.
Journal of Dairy Science **62** (suppl. 1) 50 (1979) [En] [Michigan State Univ., East Lansing, Michigan 48824, USA]

Nine 195-kg lots of whole milk were heated to 82°C and precipitated with citric acid at 2.39 g/kg; lactic culture, yoghurt culture or lipases were applied to the curd before pressing. Vacuum packed blocks were ripened at 10°C. Over a 12-wk period, all cheeses had similar composition and firmness. Max. breakdown of protein (6.08%) occurred with yoghurt culture after 8 wk ripening. pH decreased from 5.21 to 4.86 and fatty acid titre steadily increased during ripening, especially in lipase-treated samples (58% increase). The 4 wk ripened cheese containing cultures was more acceptable than control or lipase-treated cheese. DMK

27

Use of genetic alterations to improve *Streptococcus lactis* C2 as a potential Cheddar cheese starter.
Kempler, G. M.; Baldwin, K. A.; McKay, L. L.; Morris, H. A.; Halambeck, S.; Thorsen, G.
Journal of Dairy Science **62** (suppl. 1) 42-43 (1979) [En] [Univ. of Minnesota, St. Paul, Minnesota, USA]

Streptococcus lactis KB21, a stabilized transductant of *Str. lactis* C2 (a bitter strain), and which has reduced proteolytic activity, was compared with C2 and with *Str. cremoris* AM2 (non-bitter), in simulated cheesemaking conditions. After cooking of the curd, counts of KB21 were similar to those of C2. However, in pilot-scale cheese production, the expected bitter flavour with KB21 as starter, compared with C2, did not develop (judged by taste panels after 1, 3 and 6 months. Results suggest that the reduction of bitter flavour formation may be due to the lower proteolytic activity of the transductant. JMa

28

Improvement of grades of American style cheese through a plant managed, paired strain lactic culture program.
Hong, G. L.; Ernstrom, C. A.; Richardson, G. H.; Jonas, L. L.
Journal of Dairy Science **62** (suppl. 1) 71-72 (1979) [En] [Utah State Univ., Logan, Utah 84322, USA]

Bulk cultures, produced by inoculating 2 single strains of lactic cultures into a whey-based medium incubated at controlled pH at 27°C for 15-21 h, were used at 20-40% normal vol. in a plant making 140 000 kg Cheddar and Monterey cheese/day, 7 days/wk. 230 vats of cheese were made consecutively with no phage troubles, final cheese pH was better than with commercial culture blends, and cheese grades were higher and more consistent. JMa

29

Thermally shocked bacteria in the preparation of low-fat cheese.
Thompson, M. P.; Somkuti, G. A.; Flanagan, J. F.; Bencivengo, M.; Brower, D. P.; Steinberg, D. H.
Journal of Dairy Science **62** (suppl. 1) 68-69 (1979) [En] [E. Regional Res. Cent., USDA, SEA-AR, Philadelphia, Pennsylvania 19118, USA]

A 15 s exposure of *Streptococcus cremoris* ATCC 14365 at 60°C resulted in a 96% kill and total cessation of lactate synthesis. At 64°C, 87% of alanylglycine hydrolase, 72% of leucylglycine hydrolase and 85% of leucylalanine hydrolase activities were retained. Milk, containing 10^6 heat-shocked *Str. cremoris* cells/ml, was used to manufacture low-fat Cheddar-type cheese. Effects on flavour and body characteristics, and levels of free fatty acids, amino acids and 5% TCA-soluble N in cheeses cured at 5°C for 6 months were studied. MEG

30

[Use of a mixed starter consisting of lactic acid bacteria and yeast in a new process for manufacture of soft cheese from goats' milk.]
Fatichenti, F.; Deiana, P.; Farris, G. A.; Campus, R.; Vodret, A.; Carini, S.; Todesco, R.
Industria del Latte 15 (2) 13-32 (1979) [26 ref. It] [Istituto di Microbiol. Agraria e Tecnica, Univ., Sassari, Italy]

Goats' milk cheese was made on 3 occasions (in May, June and July) from pasteurized milk which was coagulated at 26°C with 0.008% rennet. On each occasion, 3 batches of cheese were made, with (i) starter alone, (ii) starter + 1000 yeast cells/ml (*Debaryomyces hansenii*) or (iii) starter + 100 000 yeast cells/ml. The starter was *Streptococcus thermophilus* + *Lactobacillus bulgaricus* (5:1). After whey drainage and brining, the cheeses were ripened at 10°C and 85-90% RH. Details are given of process parameters, microflora and composition of the cheese during ripening. After 20 days, the cheese was considered ripe and had a soft, delicate structure and agreeable flavour and odour. Best results were obtained in cheeses of type (iii), although analysis did not reveal any significant differences. ADL

31

Studies on factors affecting ropiness in Streptococcus lactis.
Ranganathan, B.; Chander, H.; Tiwari, M. P.
Milchwissenschaft 34 (6) 333-335 (1979) [11 ref. En, de] [Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal, India]

A strain of *Streptococcus lactis* causing ropiness in

milk and a 'non-ropy' variant isolated during routine maintenance were both sensitive to the same bacteriophage. Compared with the non-ropy variant, the ropy strain had lower curd tension at the setting stage (11 vs. 16 g) and lower mean viscosity (159 vs. 301 cP). Optimum incubation conditions for ropiness were 48 h at 22°C. Addition of any of the following also enhanced ropiness: 0.3% $CaCl_2$, 0.1% peptone, 1% proteose peptone, and 0.2–0.5% neopeptone. No significant differences were found in amino acid contents between ropy and non-ropy variants. CDP

32

[Kinetics of structure formation during fermentation of milk.]
Zabodalova, L. A.; Maslov, A. M.; Patkul', G. M.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 141–143 (1978) [4 ref. Ru]

The rheograms expressing the kinetics of structure formation during lactic acid production in milk exhibit 4 typical sections suggesting that there are 4 phases of structure formation. There were similar rheograms with milk coagulated with acid or with rennet. There is practically a constant 1:1 ratio between the time to reach the geiling point, and the induction period in fermenting skim milk using various strains of lactic acid bacteria. STI

33

[Yoghurt preparation.]
Yokijirushi Nyogyo Co. Ltd.
Japanese Examined Patent 5 408 737 (1979) [Ja]

The fermentation time of yoghurt is reduced by fermenting with formic acid together with pyruvic, fumaric or acetic acid in the presence of *Lactobacillus bulgaricus.* IFT

34

[Characterization of proteolytic activities from mesophilic lactic acid bacteria and their role during cheese ripening.]
Desmazeaud. M. J.; Vassal, L.
Lait 59 (587) 327–344 (1979) [34 ref. Fr, en] [Lab. de Microbiol. Laitiere & de Genie Alimentaire, INRA, F-78350 Jouy-en-Josas, France]

Intracellular proteolytic activities of *Streptococcus Lactis* (SL) strains CNRZ 29, 261 and 272, NCDO 700 and ML8, *Streptococcus cremoris* HP and AM2, and *Str. lactis* subsp. *diacetylactis* (SLD) CNRZ 258 and 267 were determined using casein, L-leucine-β-nitroanilide, amino acid-β-naphthylamides and dipeptides as substrates. Caseinolytic acitivity of SLD 267 was 3.5 × that of SL 700. Polyacrylamide gel electrophoresis of cell-free extracts of the 9 strains showed marked individual variations in the types and electrophoretic properties of the amino peptidases and dipeptidases present. Small pressed cheeses were made using 3 of the strains (SLD 267, SL 700 and SL 261, with max., min. and intermediate caseinolytic activity, resp.). The % soluble N at pH 4.6 and the % non-protein N increased at about the same rate in all 3 cheeses during 80 days ripening, but the % of N soluble in phosphotungstic acid was greater in the cheese made with SLD 267, indicating that this organism had greater exopeptidase activity. Caseinolytic activity, present in soluble cheese extracts, decreased during ripening but was highest in cheese made with SLD 267; dipeptidase activities were also present in the soluble cheese extracts during ripening, but no aminopeptidase activities (for the synthetic substrates) could be detected. Electrophoresis of the casein fraction of the cheese showed that only SLD 267 brought about changes in the α_{s1}-casein component during ripening. The advantages of measuring the proteolytic activities of lactic acid bacteria before using them in cheese starters are discussed. MEG

35

[A medium enhancing the growth of a lactic culture, *Streptococcus lactis*. Practical applications.]
Steeg, L.
Bulletin de l'Academie Veterinaire de France 51 (2) 167–172 (1978) [3 ref. Fr, en] [Univ. de Caen, Villa Santa Cruz, Boulevard d'Angleterre, 14150 Ouistreham-Riva Bella, France]

The medium is prepared by mixing 6 parts of a papain-digested conc. whey solution with 9 parts of a heat-killed cheese whey-grown culture of *Saccharomyces cerevisiae*, adjusting to pH 6.8, and adding burst cells of the same yeast spp. in aqueous solution containing glycerol/maize flour or glucose prior to drying. Counts of *Str. lactis* (1 g freeze-dried culture/100 ml) in the medium after 24 h at 24° and 34°C, resp., were 4040 million and 4360 million/ml vs. 1460 million and 1740 million/ml in sterilized milk. This strain of *Str. lactis*, which survived for 1 h at 50°C and tolerated pH 3.8–4, survived for ≥ 6 months when dried in the medium. Pre-incubated cultures of *Str. lactis* in this medium were inhibitory to *Escherichia coli.* Possible applications of this medium, e.g. production of butter and cheese cultures, are discussed. MEG

36

Intracellular proteinase from *Streptococcus* cremoris.
Arora, J. L.; Krishna Rao, L.; Sannabhadti, S. S.; Srinivasan, R. A.
Journal of Food Science 44 (5) 1350–1352, 1361 (1979) [28 ref. En] [Div. of Dairy Microbiol., Nat. Dairy Res. Inst., Karnal 132001, India]

An intracellular proteinase from *Streptococcus cremoris* was isolated, partially purified and characterized. A 40-fold purification was obtained with retention of 73% of the original activity. The proteinase exhibited normal reaction kinetics with respect to enzyme concn. and reaction rate. Proteinase activity was optimal at pH 7.0 and 37°C. The enzyme showed max. activity on casein, α-casein being preferentially degraded. Effects of metal ions, some inhibitors and reducing agents were studied. IFT

37

[Effect of cultivation conditions on yield of biomass of lactic bacteria.]
Ayunts, K. M.; Vegapetyan, K. V.; Ter-Kazar'yan, S. Sh.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 2, 56–57 (1979) [8 ref.

Ru][Erevanskii Zoovet. Inst., Erevan, USSR]

Effects were studied of age and amount of inoculum, and duration of cultivation on yield of biomass of lactic bacteria used as a starter for Sovetskii cheese (mixture of *Lactobacillus plantarum, L. lactis, Streptococcus faecalis* and *Str. thermophilus).* Max. yield of bacterial concentrate was obtained using 1% of a 14-h culture, incubated for 14–16 h at 40°C. STI

38

Continuous culture of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* and their use for flavor development in cheese made by direct acidification.
Keller, B.
Dissertation Abstracts International, B 38 (12) 5829: Order no. 78-04428, 146pp. (1978) [En][Univ. of Wisconsin, Madison, Wisconsin 53706, USA].

Mozzarella cheese was made by direct acidification with or without (control) added *Str. thermophilus* ST4 or *L. bulgaricus* LB cultures. Cheese composition was unaffected. An untrained panel preferred cheese made with the starter cultures whereas an expert judge rated ST4 more acceptable, and LB less acceptable, than control cheese. Using continuous propagation methods, growth rates of both cultures increased with higher pH and temp., and lactic acid production increased with increasing temp. and lower pH. Dilution tests showed that the effect of pH was similar in batch and continuous culture whereas temp. effects were reversed. MEG

39

[Use of starter cultures in the manufacture of cured sausages.]
Nordal, J.
NINF Informasjon No. 3, 19–29 (1979) [No]

Although starter cultures are not used by the majority of the 25 small (≤280 t/yr) cured sausage producers in Norway, all but 1 of the 7 large (400–1821 t/yr) producers do use them. Lactobacilli are considered the best organisms under Norwegian conditions. Use of starter cultures shortens maturation time, reduces losses and improves product colour development and consistency. Selection of correct type and quality of carbohydrate substrate for lactic acid production is important; raw material quality, salt concn. and environmental conditions also play important roles. HBr

40

Autolysis and bile sensitivity in *Lactobacillus acidophilus.*
Johnson, M. E.; Speck, M. L.; Ray, B.; Klaenhammer, T. R.
Abstracts of the Annual Meeting of the American Society for Microbiology 79, 211 (1979) [En][N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]

Frozen conc. cultures of *L. acidophilus* had increased susceptibility to bile salts after thawing. This injury was manifested by the ability of thawed cells to form colonies on MRS agar but not when the agar contained 0.15% oxgall (MRSO agar). A highly autolytic variant of *L. acidophilus* 4962 indicated that cell wall damage was a possible explanation for the increased bile sensitivity. Log phase cells grown in modified trypticase soy broth were centrifuged and resuspended in either sodium citrate or phosphate buffer. Autolysis of the cells was detected by reduction in optical density of 650 nm. Samples were removed periodically and plated on MRS and MRSO agars. A rapid decline in plate counts was observed concurrent with an increase in bile sensitivity as noted by a much lower plate count on MRSO agar than on MRS agar. Repair, or the ability of the damaged cells to regain their ability to form colonies on MRSO agar, was observed by resuspending cells in MRS broth at 37°C. Repair occurred in the presence of chloramphenicol, penicillin, and D-cycloserine at concn. sufficient to inhibit growth. AS

41

[Comparative investigations on culture media for detecting lactic acid bacteria causing spoilage of beer.] Vergleichende Untersuchungen mit bekannten Nährboden zum Nachweis bierschädlicher Milchsäurebakterien.
Matsuzawa, K.; Kirchner, G.; Wackerbauer, K.
Monatsschrift für Brauerei 32 (7) 312–318 (1979) [29 ref. De, en, fr][Biol. Lab., Versuchs- & Lehranstalt für Brauerei, Berlin]

11 culture media for detection of lactobacilli and pediococci (Raka-Ray medium; Hsu's *Lactobacillus* & *Pediococcus* medium, MRS medium, LS medium, sucrose medium, VLB-57 medium, VLB-L41 medium, Lee's multidifferential agar, 2 modifications of the Nakagawa medium and slightly-hopped ammoniacal beer agar) were tested for suitability for microbiological control applications in the brewery. Growth of lactic acid bacteria and other microorganisms not causing beer spoilage was evaluated. Comparative studies were conducted with microaerobic and anaerobic culture, and effects of the inhibitors phenyl ethanol and actidione were evaluated. Tables of results are given. Raka-Ray, MRS and LS media gave the most rapid growth of lactic acid bacteria, but also gave excessive growth of other microorganisms. Microaerobic culture gave considerably better results than anaerobic culture. Addition of inhibitors to the media giving rapid growth failed to give any advantage over the VLB-57 medium. This medium is recommended because of its high selectivity. Media such as Raka-Ray agar are appropriate only for short incubation times. No single medium was optimal for all characteristics considered; possible combined use of a selective and a non-selective medium is also considered. TUB-IGB

42

[Suitability of different nutrient media for detection of lactobacilli.] Eignung verschiedener Nährmedien zum Nachweis von Lactobacillen.
Hug, H.; Schlienger, E.; Pfenninger, H.
Brauerei-Rundschau 89 (9) 145–148 (1978) [9 ref. De] [Versuchssta. Schweizerischer Brauereien, Zurich, Switzerland]

Lactobacilli are considered the most important noxious contaminants of beer, brewery water being increasingly implicated as their source. Tests by the authors showed that *Lactobacillus casei, L. brevis, L. plantarum* and *Pediococcus cerevisiae* survived in mains

water for 2, 7, 5 and 5 months resp. at 8°C, and for <1, 2, 1.5 and 0.5 months at 28°C. Using these microorganisms, and also undefined 'lactobacilli' isolated from cloudy beer, the value of 6 selective media for lactobacilli detection was studied. It is concluded from results of culturing tests at 28°C, graphically presented in detail, that Raka-Ray No. 3 medium [see FSTA (1976) 8 3H404] and the medium of de Man et al. [*Journal of Applied Bacteriology* (1960) 23 (1) 130] were the best for the purpose. SKK

43

[Enumeration of bifidobacteria in dairy products.]
Teraguchi, S.; Uehara, M.; Ogasa, K.; Mitsuoka, T.
Japanese Journal of Bacteriology [Nihon Saikingaku Zasshi] 33 (6) 753–761 (1978) [8 ref. Ja, en] [Morinaga Milk Ind. Co. Ltd., 4-4-22 Meguvo, Tokyo 153, Japan]

An improved selective medium, developed for enumerating bifidobacteria in dairy products containing lactobacilli and streptococci, consisted of BL agar (3 g Oxoid Lab-lemco, 10 g proteose-peptone No. 3, 5 g Trypticase, 3 g Phytone, 5 g yeast extract, 150 ml liver extract, 10 g glucose, 0.5 g soluble starch, salt solutions, Tween 80, 0.5 g cysteine, 15 g agar and water to 1 l) supplemented with 100 µg neomycin sulphate, 200 µg paromomycin sulphate, 15 µg nalidixic acid and 3 mg LiCl/ml (NPNL agar). Examination of BL and NPNL agar plates inoculated with bifidobacteria (*Bifidobacterium bifidum, B. longum, B. infantis, B. breve,* and *B. adolescentis),* with lactobacilli (*Lactobacillus bulgaricus, L. jugurt, L. lactis, L. acidophilus, L. salivarius, L. plantarum, L. casei)* and with *Streptococcus thermophilus* and incubated anaerobically at 37°C, showed that only the bifidobacteria grew in the NPNL agar. In studies with commercial dairy products, the NPNL agar (or a modified version of it containing only 30 µg neomycin and 50 µg paromomycin/ml) was able to detect bifidobacteria in a lactic acid beverage said to contain *B. longum,* but no bifidobacteria could be detected in 3 other lactic acid beverages or in 2 samples of yoghurt. [From En summ.] MEG

44

Morphology of bacteriophages of *Lactobacillus bulgaricus, L. lactis* and *L. helveticus.*
Accolas, J.-P.; Spillman, H.
Journal of Applied Bacteriology 47 (2) 309–319 (1979) [20 ref. En] [Lab. für Milchwissenschaft, Eidg. Tech. Hochschule, Eisgasse 8, CH-8004 Zurich, Switzerland]

The morphology (determined by electron microscopy) of 11 virulent phages, isolated from cheese or yoghurt factories, and active on the title thermophilic lactobacilli (used as starters) is described. HBr

45

[Lipolytic activity of lactic acid and propionic bacteria.]
Umanskii, M. S.; Borobkova, Yu. A.
Molochnaya Promyshlennost' No. 6, 20–23, 46 (1979) [Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti NPO Uglich, USSR]

Lipolytic activity of 42 strains of thermophilic and 51 strains of mesophilic lactic acid bacteria (*Streptococcus thermophilus, Lactobacillus helveticus, L. lactis, Str. diacetilactis)* and of 33 strains of propionic acid bacteria (*Propionibacterium shermanii, P. freudenreichii, P. jensenii, P. technicum* and *P. pentosaceum)* was studied with a view to using them for regulating the lipolysis in Sovetskii cheese. The results show that amongst the species studied were found strains with high, medium and low lipolytic activity as well as those not possessing it at all. The greatest number of highly lipolytic strains belonged to *Str. diacetilactis, L. helveticus* and *P. shermanii.* In cheesemaking studies using 2 starters prepared from the strains studied, the extent of lipolysis in Sovetskii cheese was directly related to lipolytic activity of the starters. It is concluded that lipolytic activity of starter flora is closely associated with the extent of lipolysis in the cheese and has a considerable effect on cheese quality. FL

46

Isolation of *Leuconostoc* bacteriophages from dairy products.
Shin, C.; Sato, Y.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 50 (6) 419–422 (1979) [8 ref. En] [Lab. of Food Sci. & Tech., Nagoya Holy Spirit Junior Coll., Seto-shi, 489, Japan]

4 different *Leuc. cremoris* phages were isolated from Blue cheese, 7 *Leuc. dextranicum* phages from Gouda, Cottage and Blue cheeses and pasture, and 7 *Leuc. mesenteroides* phages from Gouda, Edam, Camembert, Blue and cream cheeses. Further tests with 4 of these phages against 31 *Leuconostoc* strains showed that they had a very narrow host range; one phage lysed 5 of 7 *Leuc. cremoris* strains, one lysed 2 of 7 *Leuc. mesenteroides* strains, and the other 2 phages each lysed 4 different strains out of 16 *Leuc. dextranicum* strains. CDP

47

[Present position of the problem of milk contamination by antibiotics.]
Jacquet, J.; Auxepaules, M.
Bulletin de l'Academie Veterinaire de France 51 (1) 73–79 (1978) [8 ref. Fr, en] [Lab. de Microbiol., UER des Sci. de la Vie et du Comportement, Univ., 14032 Caen Cedex, France]

The incidence of samples of raw milk deliveries in the Calvados department (France) containing antibiotics descreased from 0.63% in 1971 to 0.46% in 1972 and to 0.26–0.30% in 1974–1977. Changes in antibiotic sensitivity of lactic acid bacteria since 1951 are discussed. Recent examination of Camembert cheese produced in the laboratory in the presence of increasing quantities of added penicillin showed that penicillin at >200 IU/l progressively stimulated development of coliforms, but that, contrary to findings 18 yr ago, lactic streptococci maintained or increased their counts. This increased resistance of lactic acid bacteria to antibiotics was confirmed by examination of resistance of 5 spp. of streptococci and 6 spp. of lactobacilli to a number of antibiotics. SKK

48

[*Lactobacillus acidophilus:* biochemical properties and use in dairy products.]
Bartoli, I.; Carini, S.
Latte 3 (3) 169–179 (1978) [54 ref. It] [Cent. per lo Studio Tecnologico, Bromatologico e Microbiol. del Latte, CNR, Univ., Milan, Italy]

13 strains of *L. acidophilus* were examined, 6 from Lab. Wiesby, Federal Republic of Germany, 1 from Yugoslavia and 6 from Nestle, Switzerland. In milk or milk + 10% MRS, acidity levels of 0.3–1.4 and 0.9–1.7% lactic acid, resp., were achieved within 15 days by the strains. In 24 h the pH reached 4.2–4.6 with Eh −180 to −255 mV. Both α- and β-casein were hydrolysed by the strains, and caseinate was hydrolysed by cell-free extracts. Marked variations were found between strains in the amounts of free amino acids released from caseinate. JMD

49

Continuous process for ammonium-lactate fermentation of deproteinized whey.
Stieber, R. W.; Gerhardt, P.
Journal of Dairy Science 62 (10) 1558–1566 (1979) [22 ref. En] [Dep. of Microbiol. & Public Health, Michigan State Univ., East Lansing, Michigan 48824, USA]

50

[Lactic acid fermentation of whole egg. II. Changes in egg proteins and free amino acid content during sterilization and lactic acid fermentation.]
Katamine, S.; Mamiya, Y.; Sekimoto, K.; Furukawa, N.; Yamanaka, Y.
Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 25 (6) 311–317 (1978) [19 ref. Ja, en] [Res. Cent., Nihon Nosan Kogyo Co. Ltd., Daimura-cho, Midoriku, Yokohama, Japan]

Whole egg, with and without 1% added glucose, was sterilized, and then incubated at 37°C after inoculating with resting cells of *Lactobacillus acidophilus* L 54. Viable cell count of whole egg with added glucose was 3×, and titratable acidity 5×, that without added glucose after 20 h fermentation. Changes in polyacrylamide gel electrophoresis patterns were mostly caused by irreversible acid denaturation of egg protein at the low pH (4.0). Lysozyme activity of whole egg was reduced by sterilization, but then remained unchanged during fermentation for 72 h. Total amounts of free amino acids were hardly affected by sterilization and fermentation; threonine concn. gradually decreased during fermentation, but concn. of other free amino acids were unchanged. [From En summ.] HBr

51

The effect of lactic acid bacteria on some properties of mechanically deboned poultry meat.
Raccach, M.; Baker, R. C.
Poultry Science 58 (1) 144–147 (1979) [15 ref. En] [Poultry Sci. Dep., Cornell Univ., Ithaca, New York 14853, USA]

A 50–50 mixture of meat lactic acid starter cultures (*Pediococcus cerevisiae* and *Lactobacillus plantarum*) was inoculated (2×10^9 cells/g) into mechanically deboned poultry meat (MDPM). The MDPM was stored at 3°C for 7 days. The thiobarbituric acid (TBA) test, the emulsifying and water-holding capacities, and colour were examined. At the end of the storage period, the MDPM samples treated with the meat starter cultures had lower TBA values than the untreated sample (4.6 vs. 5.4, resp.). The meat starter cultures did not affect the meat protein as both the emulsifying and water-holding capacities were similar to the control. No deterioration of the red colour of the MDPM was noticed during the whole storage period. The lactic acid meat starter cultures inhibited the growth of the MDPM psychrotrophic bacterial population by 100 fold, keeping it below spoilage level (10^7 cells/g). AS

52

A study of the measurement and degradation of folic acid.
Ruddick, J. E.
Dissertation Abstracts International, B 39 (12) 5823 (1979) [En] [Univ. of British Columbia, Vancouver, British Columbia V6T 1W5, Canada]

Comparative studies on detn. of various forms of folic acid by a radioassay procedure and by microbiological assay using *Lactobacillus casei* are described. For N^5-methyltetrahydrofolic acid, coeff. of detn. were 0.86 for both methods; radioassay was, however, faster, simpler and more accurate than the microbiological method. Response of the 2 methods to pteroylglutamic acid (another source of folate activity) differed from the response to N^5-methyltetrahydrofolic acid. It is concluded that these 2 analytical techniques are suitable for detn. only of the form of folate used to construct the standard curve for the assay; neither was suitable for quantitative detn. of folate in foods. It is concluded that literature data for folate concn. should be compared only with other results obtained using the same method. Available data for folate concn. in foods may be of limited value for evaluation of nutritional significance of dietary folate sources. Studies on degradation of N^5-methyltetrahydrofolic acid show degradation to be a pseudo 1st-order reaction in the presence of excess O_2, but a 2nd-order reaction with a limited O_2 supply. Presence of reducing agents delayed degradation of N^5-methyltetrahydrofolic acid, but did not influence the rate constants of the reaction. The importance of reducing agents for folate retention in heat-treated foods is discussed; experiments showed ascorbic acid to delay folate degradation in heat-treated foods. AJDW

53

[Survey of residual volatile components in polystyrene food containers.]
Watanabe, Y.; Sato, K.; Yoshida, R.; Endo, F.
Annual Report of Tokyo Metropolitan Research Laboratory of Public Health 28 (1) 175–179 (1977) [4 ref. Ja, en] [Tokyo Metropolitan Res. Lab. of Public Health, 24-1, Hyakunincho 3 chome, Shinjuku-ku, Tokyo, 160 Japan]

Content of volatile components in 129 polystyrene food containers was determined by gas

chromatography and migration of styrene monomer into food-simulating solvents was studied. Tabulated results (in En) show contents of total volatiles (TV), toluene, ethyl benzene, *iso*-propyl benzene, *n*-propyl benzene and styrene monomer (SM) in each container analysed. Mean contents of TV and SM (p.p.m.) were: in 29 convenience food containers, 923.1 and 488.6 resp.; in 25 trays 956.7 and 627.6; in 43 containers for lactic beverage 932.3 and 673.2; and in 35 other containers 1230.2 and 824.2. Content of TV was always <4000 p.p.m. Migration studies with convenience food containers showed that in water after 30 min concn. of 0.01–0.12 and 0.01–0.04 p.p.m. SM were achieved from standard and foamed polystyrene, resp. Corresponding results for *n*-heptane were, after 1 h at 25°C 0.12–1.74 and 0.2 p.p.m. and after 1 h at 40°C 0.44–4.60 and 0.20–0.56 p.p.m. [From En summ.] DIH.

54

Fermentation of soy milk by lactic acid bacteria. A review. [Review]
Mital, B. K.; Steinkraus, K. H.
Journal of Food Protection 42 (11) 895–899 (1979)
[56 ref. En] [Dep. of Food Sci. & Tech., Univ. of Agric. & Tech., Pantnagar, District, Nainital, India]

Fermentation of soy milk with lactic acid bacteria to give cheese or yoghurt-like products acceptable to Western tastes (and with reduced flatulence potential) is reviewed. Organisms used must be able to ferment sucrose, raffinose or stachyose unless the soy milk is supplemented. Use of *Streptococcus thermophilus, S. thermophilus + Lactobacillus bulgaricus, S. faecalis, L. acidophilus* and *L. plantarum* is discussed, along with other lactic acid bacteria and combination cultures. Problems of acid production in soy milk, and effects of soy milk production on subsequent fermentation and flavour are described. More research is needed on microbial utilization of soybean oligosaccharides, and on proteolytic and lipolytic activities of lactic cultures suitable for production of cheese-like products. DIH

55

[Lactobacillus jelly product.]
Takechi Chlorella Kenkyusho Co. Ltd.
Japanese Examined Patent 5 422 500 (1979) [Ja]

Lactobacillus is cultured in a medium containing glucose, yeast extract, and broth, or a chlorella extract, followed by addition of a seasoning and gelling agent (e.g. gelatin). IFT

56

[Evaluation of the D(-) and L(+)-lactic acid contents in wines.] Zur Beurteilung des D(-)- und L(+)-Milchsäuregehaltes in Wein.
Bandion, F.; Valenta, M.
Mitteilungen Klosterneuburg, Rebe und Wein, Obstbau und Früchteverwertung 27 (1) 4–10 (1977)
[9 ref. De, en, fr] [Landw.-chem. Bundesversuchsanstalt, A-1020 Vienna, Austria]

Free D and L-lactic acid were determined separately in impeccably produced and in microbiologically affected wines by means of an enzymic method suitable for routine checks. All impeccable wines checked contained <1 g D-lactic acid/l, L-lactic acid values fluctuating heavily. The suitability of seperate D and L lactic acid detn. to prove adulterations by addition of lactic acid or abnormal activity of microorganisms, and for identity tests in wines is discussed. AS

57

Fermentation and relative nutritive value of rice meal and chips.
Tongnual, P.; Fields, M. L.
Journal of Food Science 44 (6) 1784–1785 (1979) [En]
[Dep. of Food Sci. & Nutr., Univ. of Missouri, Columbia, Missouri 65211, USA]

Natural lactic acid fermentation of rice meals produced significant ($P < 0.05$) increases in isoleucine, lysine, relative nutritive value and riboflavin content of the meals. Niacin and thiamin decreased significantly ($P < 0.05$) during fermentation. Although levels of isoleucine, lysine and riboflavin decreased during making of rice chips, the chips still contained more of these nutrients than control chips made from unfermented meal. Chips made from fermented rice meal and control rice meal were generally acceptable, thus showing that acceptable foods could be made from fermented rice meal. IFT

58

[Antagonism between lactic acid bacteria of rye starter and *Bacillus mesentericus*.]
Rakhmankulova, R. G.; Beletskaya, N. M.; Orlova, A. I.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 2, 142–143 (1979)
[3 ref. Ru] [Moskovskii Ordena Trudovogo Krasnogo Znameni Tekh. Inst. Pishchevoi Promyshlennosti, Moscow, USSR]

The effects were studied of lactic bacteria *(L. brevis, L. plantarum, L. casei* and *L. fermenti)* isolated from rye starter and dough on *B. mesentericus* cultivated on agar plates. Results showed that lactic acid bacteria antagonized growth and development of *B. mesentericus* and thus could prevent infestation of rye bread with *B. mesentericus*. The most potent antagonists, *L. casei* and *L. fermenti* strain 34, could potentially also be used against infestation of wheat bread. STI

59

Accumulation of proteinase in the cell wall of *Streptococcus cremoris* strain AM_1 and regulation of its production.
Exterkate, F. A.
Archives of Microbiology 120 (3) 247–254 (1979)
[20 ref. En] [Netherlands Inst. for Dairy Res. (NIZO), PO Box 20, 6710 BA Ede, Netherlands]

Persistent accumulation of proteinase (P_{III}) activity in the cell wall of *S. cremoris* strain AM_1 during growth depends on the presence of Ca^{2+} in the medium. In the absence of Ca^{2+}, initial accumulation of activity in the cell wall is observed, followed by a decrease to a low final level. Under this condition no increase of proteolytic activity is found in the extracellular fluid. A possible function of Ca^{2+} in the stabilization of the

enzyme is discussed. Prolonged accumulation of catalytically active proteinase P_{III} in the cell wall occurs in the absence of messenger RNA synthesis. This process involves de novo protein synthesis supported by preformed long-lived proteinase-specific messenger RNA. The extracellular concn. of amino acids and/or peptides regulates the translation of newly synthesized proteinase-specific messenger RNA and, possibly, the growth of the organism in milk. AS

60

[Technology of production of stable bacterial concentrate and its use in the dairy industry.]
Lagoda, I. V.; Bannikova, L. A.
Molochnaya Promyshlennost' No. 11, 12–15 (1978)
[11 ref. Ru][Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Numerous tests of culture media and culturing conditions in the production of concentrates of mesophilic lactic acid bacteria *(Streptococcus lactis, Str. cremoris, Str. acetoinicus* and *Str. diacetilactis),* and of methods for preservation of the concentrates are described in detail. Culturing in whey supplemented with 2% conc. maize extract for 12–14 h at 27°C when a pH of 6.4–6.6 was achieved, buffering with sodium citrate, further culturing for 6–8 h, and neutralization with $NaHCO_3$ yielded the best results. Concentrates containing 2–3 × 10^{11} bacterial cells/g were obtained by supercentrifugal separation. After 2–5 days at 5–8°C, the concentrates contained only 28–46% viable cells. Concentrates mixed 1:1 with a protective medium (15% aqueous glycerol and 5% sucrose) and frozen in granular form at −196°C (liquid N_2) could be stored for 6 months at −18°C or at from −6° to −8°C, retaining approx. 80% of their initial activity. Freeze-drying of concentrate/protective medium mixtures gave products stable for 6 months at 6–8°C or for 2 months at 18–22°C. Reconstitution of frozen or dried concentrates for industrial starter use is fully described. SKK

61

[Development of *Lactobacillus acidophilus* in skim milk.]
Pyatkova, N. P.; Lukovnikova, L. A.
Molochnaya Promyshlennost' No. 2, 36–38 (1979)
[5 ref. Ru][Sibirskii Filial Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, USSR]

Inocula of 3–5% culture of a strain of *L. acidophilus* from the collection of the authors' Institute were added to dried skim milk reconstituted to contain 18, 24, 30, 36 or 42% DM, milk reconstituted to 8.5% DM serving as control. Samples were incubated at 37°C, and pH, titratable acidity and *L. acidophilus* levels were determined at frequent intervals during 48 h. It is concluded that milk containing 18–30% DM had an increasingly stimulatory effect on *L. acidophilus* growth, while 36 and 42% had an inhibitory effect. SKK

62

[Selection of tvorog and smetana starters resistant to seasonal variations in milk quality.]
Bannikova, L. A.; Zadoyana, S. B.; Pyatnitsyna, I. N.
Molochnaya Promyshlennost' No. 2, 9–11 (1979)
[2 ref. Ru][Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Using the methods described in FSTA (1975) 7 7P1697 & (1977) 9 1P64, and beginning in 1972, 293 variants of (i) tvorog starters consisting of stable strains of *Streptococcus lactis* and *Str. acetoinicus,* and 231 variants of (ii) smetana starters consisting of stable strains of *Str. lactis, Str. acetoinicus,* and *Str. cremoris* were prepared. 43% of (i) starters and 30% of (ii) starters were selected as ensuring, in all seasons, coagulation of milk in 4.5–7 h, production of clean acid-milk taste, and good aroma and consistency. (i) starters were also satisfactorily used in accelerated tvorog production (coagulation in 1.5–3 h); dried starter preparations were introduced in 1977. SKK

63

Partial characterization of a new C3-type capsule-dissolving phage of *Streptococcus cremoris.*
Saxelin, M.-L.; Nurmiaho, E.-L.; Korhola, M. P.; Sundman, V.
Canadian Journal of Microbiology 25 (10) 1182–1187 (1979) [26 ref. En, fr][Dep. of General Microbiol., Univ. of Helsinki, Malminkatu 20, SF-00100 Helsinki 10, Finland]

A viscous, ropy, soured milk product native to Finland, called 'viili', is produced by fermenting milk at room temp. with a mixture of mesophilic streptococci (Lancefield group N) which includes capsule-forming strains of *Streptococcus cremoris.* For uncertain reasons, fermentation sometimes fails and results in a non-ropy clot. A new C3-type bacteriophage, termed KSY1, having a head about 230 nm long × 50 nm wide, a tail 35 nm long and a complex collar structure was isolated from spoiled viili. When infected with KSY1, encapsulated cultures of *Strep. cremoris* lost their capsules, although they did not serve as a host of the phage. The non-capsule forming strain *Strep. cremoris* 249 served as a host. Characteristics of KSY1 were: latent period about 150 min; average burst release 80/cell; buoyant density 1.436 g/cm^3. AS

64

[Temperature conditions within fresh Emmental cheese and their effects.] Über die Temperaturverhältnisse im jungen Emmentalerkäse und ihre Auswirkungen.
Gehriger, G.; Wüthrich, A.; Kaufmann, H.; Hofmann, J. M.
Schweizerische Milchzeitung 105 (48) 327–329 (1979) [7 ref. De][Zentralstelle für den Milchwirtschaftlichen Kontroll- & Beratungsdienst, Bern, Switzerland]

Temp. changes during 20-h pressing of Emmental cheeses were studied in various Swiss cheese factories; all factories used their own starters, and a propionibacteria culture from the Federal Institute for Dairying in Liebefeld. In further experiments, effects of pressing at press-room temp. of 10°, 20°, 30°, 40° or 50°C on temp. changes at 6 sites and lactic acid fermentation were studied in the Liebefeld experimental cheese factory, samples being taken after 6, 12, 20 and 44 h for detn. of pH, and moisture, D- and L-lactic acid and galactose. Results are graphically presented and discussed in detail. Among the main conclusions were:

temp. loss of cheese mass was primarily determined by press-room temp.; despite persistence of temp. ≤50°C in the cheese centre during the 1st 6 h of pressing, satisfactory initial acidification was found; however, maintenance of too high temp., or too rapid cooling inhibited the activity of lactic acid bacteria, and resulted in extreme cases in cheese defects. SKK

65

[Composition and biological properties of cows' milk in relation to season.]
Barabanshchikov, N. V.; Yaroshkevich, A. P.; Davidova, L. P.; Gul'ko, L. E.; Kruglova, L. A.; Avakova, I. A.
Doklady TSKhA [Sel'skokhozyaistvennaya Akademiya imeni K. A. Timiryazeva] No. 220, 57–64 (1976) [9 ref. Ru] [Moskovskaya Sel'skokhoz. Akad. imeni K. A. Timiryazeva, Moscow, USSR]

Bulk milk samples were obtained in Dec. 1971 and April, June–July and Oct. 1972 from Kholmogor cows on the experimental farm of the Timiryazev Academy and on a farm of a dairy combine. Values for each season and farm are tabulated for sp. gr., titratable acidity, contents of fat, total protein, casein, whey proteins, Ca, P, Mg and N + K, 15 free amino acids, thiamin, riboflavin, pantothenic acid, pyridoxine, vitamin B_{12}, biotin, folic acid and choline, and growth and aroma formation of a *Streptococcus diacetilactis* strain in the respective sterilized milks. Among the main conclusions were that spring milks contained 17–18% less total protein and 19–27% less casein than winter and summer milks (no values quoted for autumn), and that spring milks contained the lowest, and summer milks the highest, quantities of pyridoxine and vitamin B_{12}. SKK

66

Isolation and general properties of two intracellular amino peptidases of *Streptococcus diacetylactis*.
Desmazeaud, M. J.; Zevaco, C.
Milchwissenschaft 34 (10) 606–610 (1979) [26 ref. En, de, fr] [Lab. de Microbiol. Laitiere & de Genie Alimentaire, INRA, Jouy-en-Josas, France]

67

Inhibition of bacteria isolated from ground meat by Streptococcaceae and Lactobacillaceae.
Dubois, G.; Beaumier, H.; Charbonneau, R.
Journal of Food Science 44 (6) 1649–1652 (1979) [En] [Cent. de Recherches en Sci. Appliquees a l'Alimentation, Univ. du Quebec a Montreal, 1200 St-Alexandre, Montreal, H3C 3P8, Canada]

Cultures of the genera *Pediococcus, Lactobacillus, Leuconostoc* and *Streptococcus* were tested for their ability to inhibit 103 bacterial isolates from ground beef by a cross-streaking technique. The bacterial isolates that were inhibited to the greatest extent were Gramnegative and were classified as spp. of *Serratia, Enterobacter* and *Pseudomonas* in decreasing order. Among lactic strains, *Streptococcus* showed the strongest inhibitory power and *Pediococcus and Lactobacillus* the least strong. The *Streptococcus lactis* strains, in particular, were the most inhibitory, even though this power may vary from one strain to another in the same sp. A nonspecific inhibitory substance seemed to be responsible for this phenomenon. IFT

68

[Comparative laboratory studies on long-term action of formalin, quaternary ammonium compounds and a combination thereof on *Leuconostoc dextranicum* and *Bacillus polymyxa.]* Vergleichende Laboruntersuchungen zur Langzeitwirkung von Formalin, quartären Ammoniumverbindungen sowie einer Kombination beider auf *Leuconostoc dextranicum* und *Bacillus polymyxa.*
Blümke, R.; Müller, G.
Lebensmittel-Industrie 26 (3) 107–109 (1979) [14 ref. De, en, ru, fr] [Sektion Nahrungsgüterwirtschaft & Lebensmitteltech., Humboldt-Univ., Berlin]

Studies on the effects of various bactericides on these 2 capsule-forming bacteria are described; cultures of the 2 spp. in liquid media were held for ≤150 days at 25°C in the presence of the bactericides under test. Trials were conducted with formalin (35% formaldehyde), 'C4' (15% alkyldimethylbenzylammonium chloride), 'Fesia-mon' (10% methalkonium chloride) and a C4/formalin combination (3% alkyldimethylbenzalkonium chloride + 10% formaldehyde), each being tested at concn. of 0.001–1.0%. Tables of results are given. The results show formalin to be especially suitable for use where broad spectrum antimicrobial activity is required; min. inhibitory concn. of C4 and Fesia-mon is appreciably higher for *B. polymyxa* than for *L. dextranicum.* Inhibitory action of the 2 quaternary ammonium compounds against *L. dextranicum* was greater than that of formalin, differences in inhibitory action against *B. polymyxa* were small. Germination of spores of *B. polymyxa* was inhibited by quaternary ammonium compound at approx. half the concn. required for inhibition of vegetative cells. The bactericidal action of C4 against *B. polymyxa* spores and vegetative cells was improved by combination with formalin; no such increase was observed for inhibitory action against *L. dextranicum.* AJDW

69

Activity of NAD-dependent dehydrogenase enzyme of lactic streptococci on acetaldehyde and *n*-hexanal.
Schmidt, R. H.; Farron, L. K.; Bateh, T. R.; Araujo, P. E.
Journal of Food Protection 42 (10) 778–779 (1979) [13 ref. En] [Food Sci. & Human Nutr. Dep., IFAS, Univ. of Florida, Gainesville, Florida 32611, USA]

Alcohol dehydrogenase (alcohol:NAD oxidoreductase, E.C. 1.1.1.1) activity was observed on acetaldehyde and *n*-hexanal in homogenized cell extracts of *Streptococcus lactis* C 2. Substrate inhibition was apparent at levels of *n*-hexanal above 4.0 mM. Increased centrifugal force from 12 000 × g_n for 20 min to 350 000 × g_n for 1 h resulted in increased specific activity in the cell-extract supernatant fluids. Aldehyde dehydrogenase (E.C. 1.2.1.3) was not detected in any of the cell extracts. A possible involvement of the enzyme system with flavour modification in lactic-fermented oilseed milk is suggested. AS

70

[Growth of lactic acid bacteria on the main nitrogenous fractions of wine.]
Feuillat, M.; Bidan, P.; Rosier, Y.
Annales de Technologie Agricole 26 (4) 435–447 (1977) [13 ref. Fr, en] [Lab. d'Oenologie, Fac. des Sci., Reims, France]

Studies were conducted on growth of *Lactobacillus plantarum* B4257, *Lactobacillus fermenti* ATCC 9338, *Pediococcus cerevisiae* (isolated from a Beaujolais wine) and *Leuconostoc oenos* 15 10A on various N fractions isolated from a 1975 Aligote Burgundy wine by chromatography on Sephadex G 25. Fractions studied were: (i) proteins; (ii) peptides + nucleotides; (iii) free amino acids; and (iv), (ii) further purified by chromatography on Sephadex G 10 (oligopeptides of mol. wt. <700 being eliminated). Growth of the 4 lactic acid bacteria on (v) a papain hydrolysate of milk, (vi) yeast autolysate (high level of degradation), (vii) yeast autolysate (low level of degradation) and (viii) a mixture of pure amino acids was also studied. Tables of results are given. All 4 spp. grew well in (ii), (v), and (vi); *P. cerevisiae* and *L. oenos* (but not the other 2 spp.) grew in (iii); and only *L. oenos* grew well in (vii). No growth was observed in the other media studied. The results are discussed with reference to the need for growth factors, including low mol. wt. oligopeptides. The less demanding N source requirements of *L. oenos* partially explain the frequent occurrence of this species in wine undergoing malo-lactic fermentation. AJDW

71

[Lactic acid beverage.]
Nisshin Oil Mills Co. Ltd.
Japanese Examined Patent 5 432 078 (1979) [Ja]

Boiled rice is saccharified, added to soybean milk, sterilized and cultured with lactic acid bacteria and yeast to effect lactic and alcoholic fermentation. IFT

72

[Biology of thermophilic lactic acid bacteria and their experimental selection.] Biologiya termofil'nykh molochnokislikh bakterii i ikh eksperimental'naya selektsiya. [Book]
Musaev, Sh. M.; Ogai, D. K.
130pp. (1978) [354 ref. Ru] Tashkent, USSR; 'Fan' Uzbekskoi SSR. Price 1.20r

Results of many years of selection of thermophilic lactic acid bacteria from natural substrates are presented, and the taxonomy of locally-isolated strains is given. Methods of selection of new mutagenic changed forms are included. Strains with potential practical uses are described, particularly their physico-biochemical characteristics and the possibility of accumulation of amino acids in milk. Information on the use of active strains of lactic acid bacteria in the dairy industry in the Uzbekian socialist republic are given. The book is intended for microbiologists, biologists and workers engaged in the dairy industry. Chapters are: Thermophilic lactic acid bacteria (pp. 5–38); Experimental selection of thermophilic lactic acid bacteria (pp. 39–61); Effect of mutagenic factors on formation of lactic acid fermentation products (pp. 62–96); Composition of milk amino acids formed by wild and mutagenic forms of lactic acid bacteria (pp. 97–107); and Antibiotic activity of local strains of lactic acid bacteria and their mutants (pp. 108–119). STI

73

[Isolation and characterization of the genus *Leuconostoc* from dairy products.]
Shin, C.; Sato, Y.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 50 (8) 520–525 (1979) [14 ref. Ja, en] [Lab. of Food Sci. & Tech., Nagoya Holy Spirit Junior College, Seto-shi 489, Japan]

Leuconostoc strains isolated from dairy products were classified as 11 *Leuc. cremoris* and 34 *Leuc. dextranicum*. No *Leuc. cremoris* (from Hansen's cheese starter and Cottage cheese) produced dextran or aroma products. *Leuc. dextranicum* strains (from raw milk, pasture grass and natural cheeses) were further classified into 5 groups; most strains from dairy products did not produce dextran from sucrose. Classification of this depends largely on dextran and aroma production, and formation of acid from arabinose and xylose. [From En summ.] CDP

74

Gas-liquid chromatographic/mass spectrometric screening method for T-2 toxin in milk.
Collins, G. J.; Rosen, J. D.
Journal of the Association of Official Analytical Chemists 62 (6) 1274–1280 (1979) [10 ref. En] [Dep. of Food Sci., Rutgers-State Univ. of New Jersey, New Brunswick, New Jersey 08903, USA]

A method for analysis of T-2 toxin in milk is presented. Ethyl acetate extracts of milk samples which had been spiked with T-2 toxin were purified by TLC and derivatized with N,O-bis(trimethylsilyl)acetamide to produce the T-2 toxin trimethylsilyl ether (T-2 toxin-TMS). N,O-bis(trimethylsilyl-d_9) acetamide was used to make T-2 toxin d_9-trimethylsilyl ether (T-2 toxin-d_9TMS) which was added to the derivatized milk extract as an internal standard. Samples were analysed by combined GLC-MS using either electron impact ionization or chemical ionization MS. In electron impact ionization analyses, simultaneous monitoring of the T-2 toxin-TMS fragment ion at m/z 436 and the T-2 toxin-d_9 TMS fragment ion at m/z 445 gave a T-2 toxin-TMS detectability estimated at 6 μg/kg. In chemical ionization analyses, the T-2 toxin-TMS fragment ion at m/z 377 and the T-2 toxin-d_9 TMS fragment ion at m/z 386 were simultaneously monitored to give a T-2 toxin-TMS detectability estimated at 3 μg/kg. Average recovery was 85% at 200 μg/kg and 65% at 20 μg/kg. AS

75

A simple method for long-term preservation of stock cultures of lactic acid bacteria.
Juven, B. J.
Journal of Applied Bacteriology 47 (3) 379–381 (1979) [5 ref. En] [Div. of Food Tech., Agric. Res. Organization,

Volcani Cent., PO Box 6, Bet Dagan 50-200, Israel]
Strains of *Lactobacillus brevis, L. helveticus, L. plantarum, Leuconostoc mesenteroides, Streptococcus faecalis, Str. lactis* and *Str. thermophilus* were preserved for 6–24 months at ambient temp., partially dehydrated on granular pumice stone. 50–100 pieces of sterilized granular pumice stone (approx. 4–10 mesh) were added to 5 ml MRS broth. After incubation for 18–24 h, the stones were collected aseptically, placed on sterile filter paper to remove excess broth, and then placed in sterile 15 × 65 mm glass vials with screw caps. Vials were stored, with their caps loose, for 48 h at room temp. in a desiccator. Caps were then tightened and vials intended for prolonged storage were left in the desiccator. 6 of the cultures (*L. brevis* L-3 and 8287, *L. plantarum* TL-6, TL-9 and Lp-7 and *Leuc. mesenteroides* 8293) remained viable for 2 yr, whereas the other cultures were viable for 6–19 months. No changes in cultural or biochemical characteristics were observed during storage. MEG

76

[Species composition of starter microflora for cheeses with low scalding temperatures.]
Gudkov, A. V.; Belova, G. A.; Umanskii, M. S.; Bratsilo, T. E.
Molochnaya Promyshlennost' No. 6, 24–27, 46 (1979) [8 ref. Ru][Vses. Nauchno-issled. Inst. Maslodel'noi & Syrodel'noi Promyshlennosti, Uglich, USSR]
This review-type article lists proportions of *Streptococcus lactis, Str. cremoris, Str. diacetilactis* and *Leuconostoc* spp. in a number of USSR and foreign starters for small cheeses. Fundamental properties (growth temp., resistance to salt and H_2O_2) for component lactic acid bacteria of starters are described. The incidence of bacteriophage in cheese factories is discussed and some cheese defects are linked with species composition of starters. The prospects for inclusion of lactobacilli and enterococci in small-cheese starters are considered. SKK

77

[Characterization of *Lactobacillus bulgaricus* strains for use in the manufacture of yoghurt.]
Britz, T. K.; Dreyer, J. M.
South African Journal of Dairy Technology 11 (3) 101–106 (1979) [13 ref. Af, en][Navorsingsinst. vir Vee- & Suiwelkunde, Irene 1675, South Africa]
5 strains of *L. bulgaricus* were characterized for possible use as starter cultures in the manufacture of yoghurt. Morphological, physiological and biochemical characteristics were determined. The cell wall composition and antibiotic sensitivity were also determined. The characterization was done at 33° and 40°C, which are the incubation temp. used in the manufacture of fruit and normal yoghurt, resp. 3 strains produced slime at 33°C but very little at 40°C. The other 2 strains did not produce slime. Growth for all strains was better at 40°C than at 33°C. Certain carbohydrates were fermented at 40°C but not at 33°C. All 5 strains were sensitive to penicillin (1.5 IU). AS

78

Properties of single-strain cheese starter bacteria grown in diffusion culture.
Osborne, R. J. W.; Brown, J. V.
Journal of Dairy Research 47 (1) 141–150 (1980) [9 ref. En][Tech. Div., Milk Marketing Board, Thames Ditton, Surrey, UK]
The production of a range of single-strain cheese starter concentrates by diffusion culture and some of their subsequent properties are described. 5 strains of *Streptococcus cremoris* and 4 strains of *Str. lactis* were grown to concn. of $> 1.0 \times 10^{11}$ cells/ml, these concentrates all being of satisfactory cheese-making potential. Ammonium lactate accumulation in the system appeared to be the limiting factor to growth, although some strains were more tolerant than others. A continuous harvesting experiment demonstrated that the equipment was potentially capable of this mode of concentrate production. A cheese-making trial was carried out with concentrates produced by diffusion culture; a higher proportion of extra and upper selected cheese was obtained than from control cheese produced with conventionally propagated commercial mixed starters. AS

79

Starter culture reduces residual nitrite in bacon.
Andres, C.
Food Processing 40 (5) 56–58 (1979) [1 ref. En]
The USDA has recently approved a process for the production of bacon which uses a starter culture of lactobacilli in the pickling solution to reduce formation of nitrosamines in the bacon at the time of frying. The effect depends on the culture reducing the pH of the meat, which reduces the amount of residual nitrite in the bacon. Both reduced nitrite levels and lower pH contribute to the minimization of formation of nitrosamines. Research has also shown that the cultures effectively prevent the formation of toxins in meat previously inoculated with *Clostridium botulinum* spores. A technique for predicting the nitrosamine content of bacon at 21 days after packaging on the basis of earlier analyses is also briefly described. JRR

80

[Utilization of lactic acid bacteria starter cultures to improve shelf life of minced meat.] Einsatz von Milchsäurebakterien als Starterkulturen zur Haltbarkeitsverlängerung von Hackfleisch.
Fetlinski, A.; Knaut, T.; Kornacki, K.
Fleischwirtschaft 59 (11) 1729–1730 (1979) [7 ref. De, en][Production Lab. of Dairy Biopreparation, Cent. Administration of Dairy Ind., Ulica Warszwaska 111, 10-957 Olsztyn, POB 1, Poland]
The shelf life of refrigerated minced meat was considerably extended by addition of heterofermentative lactic acid bacteria at a count of 10^7 cells/g. Tabulated results showed that microbiological and sensory quality of inoculated samples suffered no serious deterioration during 3 days storage at 7°C. RM

81

Acidulants. [Lecture]
Goodfellow, S. J.
Proceedings of the Meat Industry Research Conference pp. 87–91 (1979) [En] [ABC Res. Corporation, Gainesville, Florida, USA]

A new curing method for bacon is described based on biological acidification using a custom-blended lactic acid bacteria starter. Currently-standard levels of nitrite (120 p.p.m.) and erythorbate (isoascorbate) are used in the pickle. pH decline resulting from growth of the starter considerably reduces nitrosamine formation and residual nitrite concn. in the bacon, without impairing protection against growth and toxin formation by *Clostridium botulinum*. Tables of experimental data are given for bacon cured by this procedure and by a conventional method. This biological acidification process has been approved by the USDA. Proposals for use of chemical acidulants are briefly considered. [See FSTA (1980) 12 5S714.] AJDW

82

Determination of the heating effect (F value) in boiled ham.
Reichert, J. E.; Bremke, H.; Baumgart, J.
Fleischerei 30 (8) 624–628, 630–633, vii–viii (1979) [5 ref. En, De, Fr, Es] [Fachhochschule Lippe, D-4920 Lemgo 1, Federal Republic of Germany]

After a brief review of literature data on the processing, microflora and keeping quality of boiled ham, studies on the heat-resistance of bacteria (group-D streptococci, lactobacilli, micrococci) in boiled ham and in meat broth are described. Heat treatment trials were conducted over the temp. range 55–73°C. Tables and graphs of data are given for survival of the bacteria studied during various heat treatment regimes. The group D streptococci were found to be the most heat resistant, having a D_{70} value of 2.95 and a z-value of 10°C. pH over the range 5.6–6.2 had no perceptible effect on heat resistance of the bacteria in meat broth. Calculation of the heat treatment regimes required for elimination of microorganisms is described. Under the conditions studied, an F 10°C, 70°C value of 40 was calculated for boiled ham products. The temp.-dependent cooking process of boiled hams was calculated to have a z-value 7°C; for adequate cooking of boiled ham, a C 7°C, 70°C value = 1 is necessary. Studies on 6 boiled ham samples showed counts to be $\leq 10^8$/g; lactobacilli generally predominated. Sulphite-reducing clostridia were present in 3 samples. AJDW

83

Preparation and characterization of dextran from molasses by the action of a locally isolated strain of *Leuconostoc mesenteroides*.
Zaidi, S. A. H.; Jafri, J.; Zuberi, R.
Pakistan Journal of Scientific and Industrial Research 20 (6) 402–404 (1977) [4 ref. En] [PCSIR Lab., Karachi, Pakistan]

The preparation of a water-soluble dextran, suitable for industrial use, from molasses by the action of a locally isolated strain of *L. mesenteroides* was studied. Acid pretreatment of molasses was not required. Production of dextran in the culture medium reached a max. of 30% of the available sucrose in 18 h. After a simple purification procedure, the ash content was reduced from 15.6 to 1.5% and the colour improved. The purified product contained 2.8% moisture, 81.5% dextran, 9.0% reducing sugars (as glucose), 0.43% N, and no ketose, was readily soluble in water with a relative viscosity of 1206 (2% at 32°C), and decomposed to glucose on complete acid hydrolysis. RM

84

Powdery composition comprising viable bifidobacteria cells and lactulose.
Ogasa, K. (Morinaga Milk Industry Co. Ltd.)
United States Patent 4 147 773 (1979) [En]

The composition is obtained by mixing 40–70% of a powder containing at least 20×10^{10} dried, viable bifidobacteria cells/g with 60–30% (by wt.) of a powder containing at least 55% lactulose. It is claimed that when the mixture is administered orally to human beings it will encourage the establishment of a favourable intestinal flora. EJM

85

[Effects of phosphates on the growth of lactic acid bacteria.]
Yu, T. J.; Kim, I. H.
Korean Journal of Food Science and Technology 11 (3) 200–205 (1979) [11 ref. Ko, en] [Dep. of Food Tech., Korea Univ., Seoul, S. Korea]

Effects of monosodium, disodium and trisodium orthophosphate (MSP, DSP and TSP resp.), α-polygel, sodium tripolyphosphate (STPP) and sodium metaphosphate (Sporix) on growth of *Lactobacillus bulgaricus*, and of a mixed culture of *L. bulgaricus* and *Streptococcus thermophilus*, were studied. For single cultures of *L. bulgaricus*, MSP and STPP gave highest growth and acidity in a skim milk medium. For the mixed culture, MSP and DSP gave the best results. In the presence of phosphates (in particular TSP), viable counts of fermented milks stored at 25°C for 7 days were higher than those in control milks without added phosphates. Stability of fermented milks (manufactured with the mixed culture) was improved by addition of phosphates, particularly MSP. [From En summ.] MEG

86

[Lactic flora of Cabrales blue cheese.]
Nunez, M.; Medina, M.
Lait 59 (588) 497–513 (1979) [22 ref. Fr, en] [Dep. de Bioquimica & Microbiol., CRIDA 06 Inst. Nat. de Investigaciones Agrarias, 8111 Madrid, Spain]

261 strains of lactic acid bacteria isolated during the manufacture of 2 batches of Cabrales blue cheese were identified as 117 *Lactobacillus* spp. (including 106 *L. plantarum*), 85 *Streptococcus* spp. (including 54 typical and 19 atypical *Str. lactis*) and 59 *Leuconostoc* spp. (including 27 *Leuc. dextranicum* and 18 *Leuc. paramesenteroides*). *L. plantarum* was the most NaCl-tolerant of the species examined, and accounted for 78 and 29% of the total bacteria at the centre of the 2 cheeses resp. after 60 days, and for

90 and 48% after 90 days; it was probably involved in the cheese ripening process. Most of the streptococci showed low NaCl-tolerance and were weak lactic acid producers. None of the *Leuconostoc* strains produced diacetyl from citrate, and their numbers were too low to play a significant role in the manufacture of Cabrales cheese. CDP

87

[Amino acid composition of bacteria of 'Yumatovo' koumiss.] (In *'Voprosy kumysodeliya i kumysolecheniya Bashkirii'* [see FSTA (1980) 12 6P1079].) [Lecture]
Shaikhiev, A. A.; Solov'eva, E. P.
pp. 135–139 (1978) [Ru]

Whey-agar cultures of *Lactobacillus bulgaricus* strains 17, 33 and 35 used for production of koumiss were hydrolysed with HCl and contents of 18 constituent amino acids were determined. Mean values tabulated for % in hydrolysate protein [see preceding abstr.] included for the 3 strains resp.: lysine, 11.31, 7.81 and 9.96%; leucine, 6.19, 7.44 and 7.55%; threonine, 6.32, 5.51 and 5.63%; valine, 5.83, 4.41 and 3.78%; phenylalanine, 4.19, 4.14 and 4.01%; isoleucine, 3.82, 4.13 and 3.72%; methionine, 1.91, 1.82 and 1.64%; and tryptophan, 1.65, 1.93 and 1.86%. Differences in lysine content between strains 17 and 33, and 35 and 33 were significant at $P < 0.001$ and $P < 0.02$ resp. SKK

88

[Freeze-dried lactic acid bacteria as starters in the meat industry.] Lyophilisierte Milchsäurebakterien als Starterkultur für die Fleischindustrie.
Kunz, B.; Blümel, W.
Fleisch 33 (9) 175–176 (1979) [5 ref. De] [VEB OSTRA Dresden, German Democratic Republic]

Conditions for preparation of freeze-dried starters (in tablet form) for meat products are discussed. Because of their greater stability, mixed cultures are superior to single-species cultures. Combinations of *Streptococcus lactis* with *Lactobacillus casei* are suitable. Freezing rate (especially the rate of transformation from the liquid to the solid state) is of considerable significance for survival of the starter organisms. The meat processing industry requires that the starter cultures should be suitable for reconstitution in tap water, and incubation at 25–30°C. Bacterial growth starts within 16 h at 24–27°C. The starter cultures should be stored in a refrigerator until required. For high counts of lactic acid bacteria in the starters, the following conditions should be observed: high availability of the protein source (e.g. enzymic hydrolysates) in the freeze-dried culture; no incorporation of starch; and adjustment of pH to 7.5–7.8 before incubation. IN

89

Lactic fermentation of green mango slices in brine.
Maitra, R. K.; Chaudhuri, D. R.; Mitra, S. N.; Bose, A. N.
Journal of the Institution of Chemists (India) 51 (4) 156–158 (1979) [4 ref. En] [Dep. of Food Tech. & Biochem. Eng., Jadavpur Univ., Calcutta – 700 032, India]

To obtain good lactic fermentation the cured mango slices should have an optimal salt content of 13–15%. The quantity of lactic acid present in the fermented slices could be conveniently measured, in commercial practice, by extraction with dry sulphuric ether. Though the recovery of lactic acid was low (only 74–76%), the correct value can be obtained by multiplying the measured value with a correction factor. CFTRI

90

Degradation of starch granules by alpha-amylase of *Streptococcus precox* NA-273.
Takaya, T.; Sugimoto, Y.; Wako, K.; Fuwa, H.
Stärke 31 (6) 205–208 (1979) [25 ref. En, de] [Dep. of Food & Nutr., Osaka City Univ., Osaka, 558, Japan]

The action of purified α-amylase of *S. precox* NA-273 on starch granules of normal maize and potato was studied. The hydrolysis was followed by measuring total soluble carbohydrates (% degradation) and glucose released. Patterns of degradation were observed by scanning electron microscopy (SEM). The main soluble product was maltose; small amounts of glucose and higher oligosaccharides were always observed. By SEM, attack was observed to start with small pits on the surface of maize starch granules; the pits increased in size and number. Pores were formed which penetrated towards the centre of the granules. The enzyme seemed to degrade the inner parts of starch granules better than the well-known general α-amylases. Optimum pH for degradation of maize starch granules was 6.0–7.0, optimum temp. 40°C. RM

91

Whey fermentation.
Friend, B. A.; Shahani, K. M.
New Zealand Journal of Dairy Science and Technology 14 (2) 143–152; 153–155 (1979) [23 ref. En] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska, USA]

This review deals primarily with utilization of whey and whey constituents by alcoholic fermentation (to whey wine and industrial alcohol), by lactic acid fermentation with whey used as the culture medium, and by fermentation to produce food-grade lactic and citric acids, and single cell proteins for animal feeding. In the discussion (pp. 153–155, 4 ref.), manufacture of a flavoured 'pop wine' from whey is discussed, and some comments are made on the production of citric and lactic acids and of carotene by whey fermentation. Gram-negative pseudomonads are suggested as suitable bacteria for converting dairy wastes into cell protein. [See FSTA (1980) 12 7P1195.] MEG

92

[Properties of intracellular enzyme extracts of selected strains of lactic acid bacteria.]
Rymaszewski, J.
Zeszyty Naukowe Akademii Rolniczo Technicznej w Olsztynie, Technologia Zywnosci No. 13, 3–48 (1978) [78 ref. Pl, ru, en] [Inst. Inzynierii & Biotech. Zywnosci, AR-T, Olsztyn, Poland]

Streptococcus lactis strain 192, *Str. diacetilactis* 265, *Str. cremoris* 333 and *Lactobacillus casei* 'Paris', all from the Olsztyn Biopreparation Institute collection of strains used for production of dried cheese starter

concentrates, were cultured in skim milk or in the media described in FSTA (1975) 7 8G468. Biomass was examined fresh or after spray-drying. For enzyme preparation, cells were disintegrated by treating suspensions with acetone at −20°C; the precipitate was dried at room temp. and extracted with phosphate buffer. The extracts were examined for protein content, proteolytic and fermentation activities, and absorption spectrum of the protein. Proteolysis of milk proteins, casein and its α_s, β, and κ fractions by the different enzyme extracts was studied. The main conclusions were that, irrespective of strain or method of culturing, the enzyme extracts while differing in activity and protein content, consisted of several fractions of which at least 2 hydrolysed casein and at least 1 fermented lactose; that all showed 2 maxima of proteolytic activity at pH 5.0–5.4 and pH 6.2–7.0; and that all spray-dried preparations were fully suitable for industrial cheesemaking and casein degradation during cheese ripening. SKK

93

Stimulation of lactobacilli by an aqueous extract of the green alga *Scenedesmus acutus* 276-3a.
Zielke, H.; Kneifel, H.; Webb, L. E.; Soeder, C. J.
European Journal of Applied Microbiology and Biotechnology 6 (1) 79–86 (1978) [20 ref. En] [GSF, Abteilung für Algenforschung & Algentech., Bunsen-Kirchhoff-Strasse 13, D-4600 Dortmund, Federal Republic of Germany]

Aqueous algal extracts (AE) of *Sc. acutus* 276-3a were tested for activity as growth factors for *Lactobacillus casei* subsp. *shirota* (2 strains), *Streptococcus lactis* and *Str. thermophilus*. In fermentation tests, addition of 12% AE had max. effect on *L. casei*, reducing by half the time taken for pH to fall to 5.0; *Str. thermophilus* was least affected and was not tested subsequently. The active compounds in AE, identified as hypoxanthine (350 μg/ml AE) and adenine (200 μg/ml), had max. effect on acid production by *Str. lactis* in milk (pH being lowered to 4.75 in 10 h) when added to the medium at 3.5 and 2.0 μg/ml resp., with 400 μg peptone/ml. AE corresponding to 1.0 mg dry wt./ml caused a reduction of pH to 5.0 in 10 h, and hypoxanthine + adenine without peptone a reduction to pH 5.3. It is concluded that the effect of the AE of *Sc. acutus* on milk souring by *L. casei* subsp. *shirota* was due to the same active constituents. JMa

94

Some characteristics of five phages capable of lysing a strain of *Streptococcus lactis*.
Sozzi, T.; Bauer, H.; Maret, R.; Dentan, E.
Milchwissenschaft 35 (1) 17–20 (1980) [18 ref. En, de] [Nestle Products Tech. Assistance Co. Ltd., Orbe, Switzerland]

5 different bacteriophages isolated from 4 *Str. lactis* strains (272, 274, 276 and 21), and from 3 different dairy factories, were tested for phage-host-medium relationships. 4 strains of *Str. lactis* (272, 274, 276 and 11) were lysed by all 5 phages and 3 other strains (14, C8 and ML3) were only lysed by 4 phages. The Ca^{2+} requirement for lysis, plaque characteristics and morphology of the phages are discussed. 2 of the phages appear to be closely related. MEG

95

Stimulation of lactic starter cultures by filtrates from milk cultures of some proteolytic spore-formers. I. *Bacillus circulans* culture filtrate.
Shehata, A. E.; Magdoub, M. N. I.; Fayed, E. O.; Hofi, A. A.
Milchwissenschaft 35 (1) 28–30 (1980) [9 ref. En, de] [Food Sci. Dep., Fac. of Agric., Ain Shams Univ., Shoubra El-Khiama, Cairo, Egypt]

Bacteria-free filtrates of cultures of *B. circulans* (NRRL B-4283), grown in a skim milk medium, were found to stimulate growth and acid production of *Streptococcus lactis*. Filtrates from 2-day cultures of *B. circulans* were more stimulatory than those from 1-, 3- and 4-day cultures. Boiling the filtrates for 5 min, before addition to the skim milk medium inoculated with *Str. lactis*, caused only a slight reduction in stimulatory activity, although proteolytic activity of the filtrate was completely destroyed. Addition of the unheated filtrate to uninoculated skim milk, and incubation for 8 h at 30°C, resulted in a slightly lower formol N content than when *Str. lactis* was also present. The stimulatory effect of the cell-free *B. circulans* culture filtrates appears to be due to protein degradation products. The practical aspects of using such extracts to increase acid production by starter cultures is discussed briefly. MEG

96

[Bacteriophage sensitivity of mesophilic lactic streptococci isolated from cheese starters.]
Dokukin, V. M.; Gudkov, A. V.; Perfil'ev, G. D.; Matevosyan, L. S.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 23, 8–12, 140 (1978) [Ru] [VNIIMiSP, Uglich, USSR]

35 strains of *Streptococcus lactis, Str. diacetilactis* and *Str. cremoris* from cheese starters were tested for sensitivity to 63 bacteriophage strains from the Institute's collection. Usually, the bacteriophages lysed several strains of the spp. examined, sensitivity of different streptococci strains varying within wide limits. 11 bacteriophages of moderate virulence showed broad spectra of lytic activity. SKK

97

[Acidifying capacity of reconstituted milk from different regions.]
Cerna, E.; Snaselova, J.
Prumysl Potravin 30 (12) 688–690 (1979) [8 ref. Cs] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

Dried milks produced in 4 dairy plants from supplies collected in 4 different geographical areas in Czechoslovakia were tested for their capacity to support fermentation with different cultures. The samples were all coliform-negative and contained $10–10^3$ mesophilic bacteria/ml. The milks, after reconstitution immediately after manufacture and then again after 6 months storage, were fermented separately with 9 different cultures (yoghurt culture, cream culture FD, *Streptococcus lactis* 347, *Str. thermophilus* T280, *Lactobacillus helveticus* Tx,

L. acidophilus, Bifidobacterium bifidum 707, *L. casei* Ca D, and *Pediococcus acidilactici* 564) and their acidifying capacity was assessed from changes in titratable acidity and pH. The results are tabulated separately for each area and each culture. Although there was some trend towards lower acidifying values for milk stored for 6 months, no statistically significant difference was established. A comparison of the results showed that acidifying capacity of the individual cultures was very variable, the cream culture FD having the lowest, and *L. casei* and *Bifidob. bifidum* the highest variability. Dried milk was found to be suitable to a varying degree as a medium for different dairy cultures. A statistical evaluation of the significance of the differences of the overall (annual) averages of the acidifying capacity of milk showed that none of the dairy plants could be designated as an unsuitable source of milk for the preparation of dairy media, but 2 plants were considered to be better than the others. FL

98

Decayed lactic bacteria - a possible source of crystallization nuclei in cheese.
Kalab, M.
Journal of Dairy Science 63 (2) 301-304 (1980) [9 ref. En] [Food Res. Inst., Agric. Canada, Ottawa, Ontario, Canada K1A OC6]

This preliminary note presents electron micrographs of Cheddar cheese particles, fixed as described in FSTA (1977) 9 12P2220. The presence of 'hairy' non-viable lactic acid bacteria is shown. At higher magnifications, the bacterial forms were shown to be lysed, with the cell interior filled with a coarse fibrillar matrix. Thin-section electron microscopy also showed that there were parallel structures inside the cells, pressing on the cell wall. The fibrillar matrix and parallel structures are thought to be crystalline in nature. It is suggested that these small crystals may act as a nucleus for crystal growth within the cheese. MEG

99

Beneficial interrelationships between certain microorganisms and humans: candidate microorganisms for use as dietary adjuncts. [Review]
Gilliland, S. E.
Journal of Food Protection 42 (2) 164-167 (1979) [26 ref. En] [Dep. of Anim. Sci., Oklahoma State Univ., Stillwater, Oklahoma 74074, USA]

The lactobacilli most often mentioned as beneficial dietary adjuncts are *Lactobacillus acidophilus, L. casei,* and *L. bifidus (Bifidobacterium bifidum).* These organisms all possess characteristics which would permit their survival and growth in the intestinal tract. They also produce antagonistic actions toward enteric pathogens. Various food products are available which contain these organisms; however, there does appear to be a need for improving the stability of these bacteria in such products. AS

100

[Method of producing a soured milk paste product for feeding babies.]
Korobkina, G. A.; Kalinina, N. N.; Pyatkova, N. P.; Lukovnikova, L. A. **(Union of Soviet Socialist Republics,** Institut Pitaniya AMN SSSR; **Union of Soviet Socialist Republics,** Sibirskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Molochnoi Promyshlennosti)
USSR Patent 663 364 (1979) [Ru]

Skim milk is sterilized after adding stabilizing salts, and then evaporated to 30-32% TS. A mixture of vegetable oil and cream with fat-soluble vitamins is added, also dextrin-maltose, and the mixture is homogenized, pasteurized and cooled. It is then soured to 200-230°T and pH 4.0-4.3 with a *Lactobacillus acidophilus* culture. The milk fat content is preferably adjusted to 14-16%. W&Co

101

Continuous removal of lactic acid from wastewater by *Candida utilis.*
Oliva, R. U.; Hang, Y. D.
Applied and Environmental Microbiology 38 (5) 1027-1028 (1979) [8 ref. En] [Inst. of Food Sci., Cornell Univ., Geneva, New York 14456, USA]

C. utilis was grown on wastewater from sauerkraut manufacture in a continuous flow culture. Under steady-state conditions, the max. rate of lactic acid removal was 588 mg/h per l of continuous culture. The yield coeff. (g yeast produced/g lactic acid consumed) was determined by a plot of specific rate of lactic acid removal against specific growth rate; values ranged from 0.59 to 0.70, depending on substrate concn. and yeast growth rate. O_2 requirement was 0.97-1.15 g/g yeast produced. AL

102

[Quantitative determination of vitamin PP (niacin) in *Coffea canephora* var. *robusta* by a microbiological method using *Lactobacillus arabinosus.*] (In '8th International Scientific Colloquium on Coffee' [see FSTA (1980) 12 8H1257].) [Lecture]
Tchetche, A. G.
pp. 147-152 (1979) [14 ref. Fr, en] [Lab. de Chimie Organique Biol., Fac. des Sci., Abidjan]

The use of *Lactobacillus arabinosus* strain 17/5 (ATCC 8014), instead of the usual *Proteus* strain, had extended the detn. range of niacin to 0.05-0.5 µg, with the added advantage of the strain being able to grow in a synthetic medium. The niacin to be measured had been obtained from the green or roasted coffee beans by either chemical or aqueous extraction (the total niacin content of the beans being always higher then the extractable amount, although chemical extraction is superior to aqueous extraction) and then added to the medium. When the coffee beans had been roasted at temp. of 140-300°C, it was found that the amount of niacin actually had increased in the beans at 220, 240 and 260°C and only declined at 280 and 300°C. The results were reproducible. ESK

103

[Milk fermentation.]
Snow Brand Milk Products Co. Ltd.
Japanese Examined Patent 5 438 187 (1979) [Ja]

Lactic acid fermentation is carried out in a milk medium containing a fermentable sugar, and employing a var. of *Lactobacillus jugurti.* The product maintains its acidity and viable bacteria count during storage. [FT

104

[Organoleptic features and volatile components in milk fermented by some species of lactic acid bacteria.]

Suzuki, I.; Watanabe, M.; Kitada, T.; Kato, S.; Morichi, T.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 50 (11) 796–802 (1979) [17 ref. Ja, en] [Nat. Inst. of Anim. Ind., Chiba-shi 280, Japan]

Skim milk adjusted to 12% SNF and with 5% added sucrose was inoculated with one of the following strains of lactic acid bacteria: *Lactobacillus bulgaricus* B5b and B-6, *L. helveticus* BC-10, B-1 and LH-1, *L. acidophilus* LAH, *Streptococcus cremoris* H-61 and H41-21, *S. lactis* SC-10 and 5.27, *S. diacetilactis* DRC-1 and 13675, and *S. thermophilus* 510. Volatile components in the head-space gas of each cultured milk were analysed by GLC and the relationship between organoleptic characteristics and the production of volatile components was investigated. Main sensory features of milk cultured with *S. cremoris* and *S. lactis*, which panel members preferred, were sweet smell, milk flavour and refreshing sour taste. Green, musty or off-flavours were noticed in milk cultured with *L. bulgaricus, L. helveticus, L. acidophilus* and *S. thermophilus*. Main volatile components of head-space gas were acetaldehyde, acetone, ethanol and diacetyl; acetaldehyde and diacetyl were considered to have direct effects on flavour. Most of the panel detected typical 'green' or 'aldehyde' flavour in milk cultured with *L. bulgaricus* B5b or B-6 or *L. acidophilus* LAH, which had 20 p.p.m. acetaldehyde. Acetaldehyde at 7 p.p.m. was insufficient to give a desirable yoghurt flavour. Diacetyl flavour was only detected in milk fermented by *S. diacetilactis* in which there was > 1.5 p.p.m. diacetyl. BWH

105

[Evaluation of dehydrogenase activity of lactic acid bacteria.]

Grigorov, N. I.; Chebotarev, L. N.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti Nauchno-proizvodstvennogo Ob"edineniya 'Uglich' No. 24, 20–22, 105 (1978) [3 ref. Ru] [VNIIMiSP, Uglich, USSR]

Dehydrogenase activity of a *Streptococcus paracitrovorus* strain cultured in a liquid medium of pancreatin-hydrolysed milk was measured by reduction of 2,3,5-triphenyltetrazolium chloride. Addition of Fe^{3+} to the medium at 4 and, to a lesser extent, at 8 mg% markedly increased the activity; addition of Mn^{2+} at 4 or 8 mg% had the opposite effect. SKK

106

[Improvement of composition of enrichment medium for lactic streptococci.]

Belova, G. A.; Polyakov, V. B.; Bratsilo, T. E.; Lymar', V. G.; Kuznetsov, E. S.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 23, 3–8, 139 (1978) [2 ref. Ru] [VNIIMiSP, Uglich, USSR]

After numerous factorially designed tests, the following medium was selected for accumulation of lactic streptococci in production of bacterial starter preparation No. 2 [see FSTA (1977) 9 10P1576]: dried skim milk 60 g/l, glucose 10 g/l, sodium citrate 15 g/l, and maize extract 10 g/l. In laboratory tests and industrial runs, the new medium gave a 1.3–1.4-fold increase in yield of the preparation. [See also following abstr.] SKK

107

[Nutrient medium for biomass accumulation in production of bacterial starter for cheese.]

Belova, G. A.; Medvedeva, Z. P.; Kornelyuk, A. N.; Klimova, L. U.; Yulius, A. A.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti Nauchno-proizvodstvennogo Ob"edineniya 'Uglich' No. 24, 28–36, 106 (1978) [4 ref. Ru] [VNIIMiSP, Uglich, USSR]

After extensive tests, an enrichment medium for of lactic streptococci in production of bacterial starter preparation No. 2 [see FSTA (1977) 9 10P1576] was devised consisting of 30 or 50 g dried skim milk, 10 g lactose or glucose, 10 ml yeast extract, and 160 mg manganese sulphate/l. The dried skim milk was dispersed in tap water at 40–45°C, protomezenterin G10kh enzyme preparation (previously activated at 5:100 in water at 30°C) was added at 35 000 or 20 000 units/30 g milk at 53–57°C and the mixture was held at this temp. for 1 or 2 h, resp.; the other components were then added, the pH was adjusted to 7.0–7.1, and the medium was sterilized. Cheese whey may be used instead of the reconstituted milk, but enzymic hydrolysis is then carried out at pH 6.2–6.5, lactose (glucose) is not added and the medium is sterilized at pH 7.5. With this new medium, yields may be increased 2-fold. [See also preceding abstr.] SKK

108

[*Streptococcus diacetilactis* strain D25-P for use in bacterial inoculum for cultured milk products.]

Sukhotskene, I. I.; Rashkyavichene, A. A. (**Union of Soviet Socialist Republics,** Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 691 127 (1979) [Ru]

This strain is stored in the collection of the Lithuanian Section of the All-Union Research Institute for the Butter and Cheese Industry. It is a Gram-positive heterofermentative, facultatively anaerobic coccus with an optimum growth temp. of 28°C. It clots and reduces litmus milk and milk with 0.01 and 0.1% methylene blue; does not liquefy gelatin, or grow at pH 9.6, and does not form NH_3 from arginine. Glucose, lactose, maltose and starch are fermented, and sucrose weakly fermented, while arabinose, mannitol and glycerol are not fermented. It clots milk containing penicillin at 0.1–0.5 units/ml in 24 h, the diacetyl content being unaffected. W&Co

109

[*Streptococcus lactis* strain 75P, for manufacture of cultured milk beverages and rennet cheese.]

Sukhotskene, I. I.; Rashkyavichene, A. A. (**Union of**

Soviet Socialist Republics, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 691 128 (1979) [Ru]

This strain is stored in the collection of the Lithuanian Section of the All-Union Research Institute for the Butter and Cheese Industry. It is a Gram-positive homofermentative, facultatively anaerobic diplococcus, with an optimum growth temp. of 28°C. It clots and reduces litmus milk and milk with 0.01 and 0.1% methylene blue, does not liquefy gelatin, and forms NH_3 from arginine. Glucose, lactose and maltose are fermented, while sucrose, arabinose, mannitol, glycerol and starch are not. The strain is penicillin-resistant, sterile milk with penicillin at 1.0 units/ml being coagulated in 24 h. W&Co

110

[*Streptococcus acetoinicus* strain 2Al-P for manufacture of cultured milk beverages and rennet cheese.]
Sukhotskene, I. I.; Kontsyavichene, M. K.; Grubene, A. L. **(Union of Soviet Socialist Republics,** Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 691 126 (1979) [Ru]

This strain is stored in the collection of the Lithuanian Section of the All-Union Research Institute for the Butter and Cheese Industry. It is a Gram-positive, heterofermentative, facultatively anaerobic coccus with an optimum growth temp. of 28°C. It clots milk and reduces and clots litmus milk and milk plus methylene blue; does not liquefy gelatin; does not grow at 45°C or at pH 9.6; does not form NH_3 from arginine; ferments glucose, lactose and maltose strongly, and sucrose and starch weakly, whilst arabinose, mannitol and glycerol are not fermented. It clots milk containing penicillin at 0.5 units/ml, and forms volatile acids. W&Co

111

[Influence of water activity on growth of lactic and propionic acid bacteria as a function of the solute added to the culture media.] Beeinflussung des Wachstums von Milchsäure- und Propionsäure-Bakterien durch die Wasseraktivität in Abhängigkeit des Zusatzes zum Nährmedium.
Streit, K.; Rüegg, M.; Blanc, B.
Milchwissenschaft 34 (8) 459–462 (1979) [13 ref. De, en] [Eidg. Forschungsanstalt für Milchwirtschaft, CH-3097 Liebefeld, Switzerland]

The influence of water activity (a_w) on the growth of some strains of *Streptococcus lactis* and *Str. thermophilus, Lactobacillus lactis* and *L. helveticus,* and *Propionibacterium shermanii* was studied turbidimetrically. The desired a_w of the culture media were obtained by adding either glucose, NaCl, glycerol, glycine, proline, alanine, sodium glutamate or lysine-hydrochloride. For every strain, the minimal a_w allowing growth (a_w-tolerance) was found to be lowest with glycerol as the solute (range 0.924 for *Str. lactis* to 0.954 for *L. lactis).* The addition of glycine gave the highest a_w-value for every strain (range 0.976 for *L. helveticus* to 0.988 for *Str. thermophilus).* The other additives caused tolerances within this range, the sequence not being the same for every strain. Growth curves showed that the lag phase and the time for doubling the extinction increased with decreasing a_w-value below the range of optimal growth. Although *L. helveticus* was somewhat less a $_w$-tolerant than *Str. lactis* (a_w = 0.929 and 0.924, resp.), growth of *Str. lactis* was slowed down by a slight decrease of a_w, whereas *L. helveticus* was hardly influenced by values down to 0.96, but was clearly inhibited by lower values. AS

112

Preparation of creamed Cottage cheese with a *Streptococcus diacetilactis* mutant.
Vedamuthu, E. R. (Microlife Technics Inc.)
United States Patent 4 172 899 (1979) [En]

Creamed Cottage cheese made without prior fermentation or incubation of the creaming mixture is prepared by blending a concentrate of *Streptococcus diacetilactis* NRRL-B-8177 with a creaming mixture at <50°F, blending the mixture with dry Cottage cheese curd cooled to <50°F and maintaining the temp. at <50°F. This mutant strain has low acid production, besides producing a good flavour and providing protection against spoilage bacteria. EJM

113

Stimulating effect of *Micrococcus* sp. on growth and acid production of *Lactobacillus plantarum.*
[Lecture]
Erichsen, I.
Proceedings of the European Meeting of Meat Research Workers No. 24, G12:1–G12:7 (1978) [6 ref. En, de, fr, ru] [Swedish Meat Res. Cent., Kavlinge, Sweden]

7 batches of fermented sausage were made by the customary Swedish formula using beef and pork, 2.8% NaCl with nitrite at 120 p.p.m., 2% sucrose, and spices; moisture content of the final product was 42%. In each batch, 100 ml of 6 different starter cultures (containing 10^9 *Micrococcus* cells/ml + 10^4, 10^6 or 10^8 *L. plantarum* cells/ml, or 10^5 *Micrococcus* cells/ml with *L. plantarum* as above) were added resp. to six 6-kg portions of sausage mix. The sausages were ripened in casings in a chamber at 24°C and 85% RH, and smoked for 6 h on the 2nd and 6th days of fermentation. *Micrococcus* sp. and *L. plantarum* counts and pH were determined on the 3rd and 6th days. No stimulating effect of *Micrococcus* sp. on *L. plantarum* was detected, and the final pH was about the same irrespective of initial cell concn. 3 series of model experiments based on culturing the 2 microorganisms in various proportions at 30°C on nutrient media also gave negative results. [See FSTA (1980) 12 8S1280.] SKK

114

A study of the antimicrobial properties of *L. plantarum* strains isolated from raw-dried sausages. [Lecture]
Brankova, R.; Yankov, Ya.
Proceedings of the European Meeting of Meat Research Workers No. 24, G13:1–G13:6 (1978) [8 ref. En, de, fr, ru] [Meat Tech. Res. Inst., Sofia, Bulgaria]

The antagonism of 30 strains of *Lactobacillus plantarum* isolated from ripening Panagyurska Lukanka sausage against museum strains of *Streptococcus faecalis, Escherichia coli, Proteus vulgaris, Bacillus subtilis, B. cereus, B. idosus,* and *Staphylococcus aureus* was tested by the method of Kafel & Ayres [FSTA (1969) 1 10S714]. The tests were carried out on nutrient media at pH 5.0, 5.5, 6.0 or 6.5; and at 16°, 26° or 32°C, meat infusion agar at pH 7.0 and 30°C being used as standard. The results are tabulated, graphically presented and statistically interpreted in detail. The general conclusion was that the strongest antagonism was against sporeformers, *B. cereus* in particular, and also against *Staph. aureus;* and that antagonism against enterobacteria was much weaker, the least being against *Str. faecalis.* Effects of temp. and pH are discussed. [See FSTA (1980) 12 8S1280.] SKK

115

Formation of nitrosoheme and heme in dry sausages using catalase positive strains of lactic acid bacteria as starter cultures. [Lecture]
Slinde, E.; Nordal, J.
Proceedings of the European Meeting of Meat Research Workers No. 24, G11:1–G11:6 (1978) [13 ref. En, de, fr, ru] [Norwegian Food Res. Inst., PB 50, N-1432 Aas-NLH, Norway]

Salami sausages were produced by the usual commercial method as described by Skjelkvale et al. [FSTA (1974) 6 9S1201] and were examined during ripening for 14 days. Hydrophilic colour components (nitrosomyoglobin and nitrosohaemoglobin) were extracted by twice homogenizing 10 g sausage with 40 ml 50 mM potassium phosphate buffer (pH 6.9), and clearing the aqueous layer by centrifugation, and were determined by spectrophotometry. Extractability diminished sharply during ripening, falling to about 15% of the initial value in 4 days and was negligible after 6 days. At the same time numbers of lactobacilli in the sausage increased from about 10^6 to $> 10^8$/g and pH decreased from 5.65 to 5.0. It is concluded that the colour of dry sausages was mainly due to formation of hydrophobic nitrosohaem and haem during fermentation. As these pigments may be destroyed by peroxide formed during fermentation with catalase-negative lactobacilli, 9 strains isolated from available starter cultures and 5 isolated from salami sausages from 5 different factories were tested for catalase activity; all proved catalase positive in the presence of myoglobin, but had hardly any activity in its absence. [See FSTA (1980) 12 8S1280.] SKK

116

Studies on the lactobacilli species in raw-dried sausages. [Lecture]
Yankov, Ya.; Brankova, R.
Proceedings of the European Meeting of Meat Research Workers No. 24, G10:1–G10:5 (1978) [20 ref. En, de, fr, ru] [Meat Tech. Res. Inst., Sofia, Bulgaria]

12 commercial production batches of (i) Panagyurska Lukanka and 5 of (ii) Khemus sausages were examined on the 1st day after manufacture and on the 7th, 14th, 21st, 28th and 35th days of ripening and drying; isolation and classification of lactobacilli were mainly by the method of Rogosa & Sharpe [*Journal of Applied Bacteriology* (1959) 22, 329]. Lactobacilli counts were highest in both (i) and (ii) at 7 days. Overall incidences in (i) and (ii) were resp. (%): *Lactobacillus plantarum* 79.8 and 65.1; *L. casei,* 11.0 and 17.4; *L. casei* subspecies *alactosus,* 3.1 and 11.1; *L. casei* subspecies *rhamnosus,* 3.1 and 1.6; *L. cellobiosus,* 1.5 and 0; *L. buchneri,* 1.5 and 0; *L. leichmannii,* 0 and 1.6; and *L. brevis,* 0 and 3.2. [See FSTA (1980) 12 8S1280.] SKK

117

Preparation of lactobacilli for dietary uses.
Speck, M. L.
Journal of Food Protection 43 (1) 65–67, 72 (1980) [25 ref. En] [Dep. of Food Sci., North Carolina State Univ., Raleigh, North Carolina 27650, USA]

Increased use of lactobacilli as dietary supplements has emphasized the need for preparations of those cultures that possess the attributes of cell viability, resistance to bile and capability of establishing in the intestinal tract. Incompatibility of different spp. of lactobacilli may limit development of products designed to overcome objectionable flavour in, or impart improved flavour to cultured foods. Stresses that are imposed on cultures during their preparation and distribution must minimize damage to cells which would detract from the foregoing characteristics. AS

118

[Behaviour of various aromatic substances in Burgundy wines during malolactic fermentation.] Das Verhalten verschiedener Aromastoffe in Burgunderweinen im Verlauf des biologischen Säureabbaues.
Meunier, J. M.; Bott, E. W.
Chemie Mikrobiologie Technologie der Lebensmittel 6 (3) 92–95 (1979) [34 ref. De, en] [Lab. of Applied Chem. & Oenology, Univ. of Dijon, Dijon, France]

3 types of wine samples, Pinot noir, Chardonnay and Gamay, obtained from different vine growing regions, Cote Dijonnais, Cote de Nuits and Cote de Beaune (1974–1976 vintage) were inoculated with wine-adapted pure cultures of *Leuconostoc oenos* in the laboratory to study malolactic fermentation. The results were compared, by means of paper chromatography, with those obtained after spontaneous malolactic fermentation. The malic acid contents were determined enzymically before and after malolactic fermentation in both spontaneous and artificially induced cases. When the aroma concentrates of the various samples were separated into their individual aroma components by gas chromatography before and after malolactic fermentation, 17 compounds were identified and are listed. In the majority (70–100%) of samples tested, the following aromatic substances showed an increase during malolactic fermentation: n-butyl acetate, 3-hydroxy-2-butanone, ethyl lactate, ethyl n-octanoate, 2-octanol, isopentyl lactate, methyl n-decanoate, and phenylethyl hexanoate. The results indicated that there was no difference between spontaneous and artificially induced malolactic fermentation and the above quoted increases were independent of the region of cultivation, winemaking technology and mode of fermentation. ESK

119

Development of nonfermented acidophilus milk and testing its properties.
Sinha, D. K.
Dissertation Abstracts International, B 40 (2) 683: Order no. 79-18023, 90pp. (1979) [En] [Univ. of Nebraska, Lincoln, Nebraska 68503, USA]

Non-fermented acidophilus milk was prepared by adding *Lactobacillus acidophilus* cells, harvested from a corn steep liquor culture, to low fat milk at a level of 4 million cells/ml. 80% of the lactobacilli were still viable in the product after 10 days at 4°C. Feeding of the product inhibited proliferation of Ehrlich ascites tumour cells in mice. In rats, it resulted in lower blood cholesterol levels and faecal β-glucosidase and β-glucuronidase levels. The rate also gained more wt. than controls (8.6 vs. 6.3 g/day) and showed lower faecal coliform and higher faecal lactobacillus counts. CDP

120

[Characteristics of lactic acid bacteria in natural whey cultures. VI. Cytological location of the proteolytic system in *L. helveticus*.]
Vescovo, M.; Bottazzi, V.
Scienza e Tecnica Lattiero-Casearia 30 (6) 434-443 (1979) [22 ref. It, en] [Istituti di Microbiol., Univ. Cattolica, Piacenza, Italy]

It is considered that selected strains of *Lactobacillus helveticus*, found in large numbers in 24-h-old Grana cheese, could be used to accelerate ripening of the cheese. ADL

121

[Effect of chlorophos on the growth and development of lactic acid bacteria.]
Erzinkyan, L. A.; Pakhlevanyan, M. Sh.; Pakhlevanyan, A. Sh.
Biologicheskii Zhurnal Armenii 31 (8) 842-847 (1978) [11 ref. Ru, en, am] [Inst. Mikrobiologii AN ArmSSR, USSR]

The effects of chlorophos and 2 other preparations, Hypodermin-Chlorophos and "preparation R" were studied on *Lactobacillus acidophilus* strain 317/402, *L. plantarum* strain 13, and *Streptococcus lactis* strain 7. The highest resistance to chlorophos and its derivatives was observed with the strain of *L. acidophilus* which was able to decompose chlorophos. The practical importance of this strain for the processing of milk contaminated with organochlorine pesticides is outlined. STI

122

[Production of lactic acid bacteria concentrates.]
Kostrova, I. E.; Krasnikova, L. V.; Sharobaiko, V. I.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 4, 7-12 (1979) [32 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, Leningrad, USSR]

Trends in producing concentrated starters are reviewed and the advantages of continuous culture to accumulate biomass of lactic acid bacteria are indicated. Special attention is given to the composition of culture medium, effect of pH and temp., method of neutralization of lactic acid, agitation of the medium, effect of nutrient dilution rate, and effect of concn. and cultivation on the ratio of individual types of bacteria in the concentrates. Although batch culture is favoured at present, continuous culturing is considered promising for the future. STI

123

Union of Swiss Societies of Experimental Biology. Abstracts of the 12th Annual Meeting. [Conference proceedings]
Switzerland, Union Schweizerischer Gesellschaften für Experimentelle Biologie
Experientia 36 (6) 690-766 (1980) [En]

Abstracts are published of papers presented at the 12th Annual Meeting of the Union of Swiss Societies of Experimental Biology, held at Basle, 13-14 March 1980. These include the following. The major acid soluble proteins of the soybean, by P. Amiguet (p. 764). Antibacterial activity of skim milks fermented with lactic bacteria, by H. Amster & R. Jost (p. 764). Plastein synthesis as a new approach to supply essential amino acids in product fortification, by R. Jost, J. C. Monti & R. S. Temler (p. 765). DIH

124

Abstracts of the XII International Congress of Microbiology held in Munich, 3-8 September 1978. [Conference proceedings]
International Association of Microbiological Societies 222pp. (undated) [En]

This publication contains abstracts of invited lectures, symposia and posters presented at the XII International Congress. The symposia included the following titles: Metabolism of wine associated lactic acid bacteria, by R. E. Kunkee (p. 19). Metabolism of cider bacteria, by J. G. Carr & G. C. Whiting (p. 20). Significance and biology of the lactic acid bacteria of sourdough, by G. Spicher (p. 20). The metabolism of carbohydrates by *Bacillus stearothermophilus* and its significance for the technology of beet sugar production, by H. Klaushofer (p. 20). Bacterial flora of poultry: changes due to variations in ecological conditions during processing and storage, by C. Lahellec (p. 21). Cured meats, by T. A. Roberts (p. 22). Posters presented included the following titles: Vitamin enrichment of wine by Spanish 'flor' yeasts, by M. Pilar Aznar (p. 150). Improved enrichment method for salmonella isolation from foods, by P. Vassiliadis, D. Trichopoulos & J. A. Papadakis (p. 171) [see also FSTA (1979) 11 10S1498]. Metabolic compatibility of lactic acid bacteria and micrococci for manufacturing of dairy products, by B. Stevic, M. Sutic & M. Stojanovic (p. 174). Abstracts of a further 35 papers and posters appear individually in FSTA and are listed in the author index under International Association of Microbiological Societies [Symposium]. DIH

125

[Dependence of thermal inactivation of microorganisms on pH-value of media. II. Bacteria and bacterial spores.] Abhängigkeit der thermischen Abtötung von Mikroorganismen vom pH-Wert der Medien. II. Bakterien und Bakteriensporen.

Cerny, G.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 170 (3) 180–186 (1980) [13 ref. De, en]
[Fraunhofer-Inst. für Lebensmitteltech. & Verpackung, Schragenhofstrasse 35, D-8000 Munich 50, Federal Republic of Germany]

Dependence on pH of heat stability of vegetative cells of *Lactobacillus lactis*, and *Bacillus subtilis*, and of spores of *B. subtilis* and *B. stearothermophilus* was studied. *L. lactis* cells were more heat stable than yeasts or moulds, and at 65°C were most stable at pH 6 (D-value 28 s). At 70°C D-values were ≤2 s at all pH values. Vegetative *B. subtilis* cells had max. D-values (pH 7.0) of 3 min at 53°C and 22 s at 58°C; i.e. of the same order as those of yeasts and moulds. Cells were less stable at pH <7 or >7. *Bacillus* spores were much more heat resistant, and resistance was dependent on pH even at temp. of 120–130°C; the effect only became negligible at ≥140°C, i.e. UHT-treatment temp. Bacterial spores and cells were most heat stable at pH 6–7; z-values of *B. stearothermophilus* rose markedly at low pH values. [See preceding abstr. for part I.] DIH

126

[Use of lactic acid bacteria in food.]
Inagami, K.
Fermentation and Industry 37 (2) 121–132 (1979) [32 ref. Ja] [Tokyo Res. Lab., Calpis Shokuhin Kogyo, Tokyo, Japan]

In this review article the lactic acid bacteria *Streptococcus, Leuconostoc, Pediococcus* and *Lactobacillus* spp. are characterized and the reactions involved in the formation of acids and flavour in different types of fermented dairy products and cheese are summarized. The role of lactic acid bacteria in making Japanese pickles, silage, soy sauce, miso, sake, soybean milk, soybean cheese, and some other products is outlined. The majority of references are to articles in Japanese. BWH

127

Slime production by brewery strains of *Pediococcus cerevisiae*.
Oevelen, D. van; Verachtert, H.
Journal of the American Society of Brewing Chemists 37 (1) 34–37 (1979) [25 ref. En] [Lab. of Ind. Microbiol. & Biochem., Univ. of Louvain, Kard, Mercierlaan 92, B-3030 Leuven, Belgium]

By its formation of lactic acid and diacetyl, *P. cerevisiae* is essential in the production of lambic beer, a Belgian beer with an acid, vinous character. *P. cerevisiae* strains may, however, turn the beer to an oily fluid, a disorder that is known as ropiness. Microbial analysis of ropy and nonropy lambic samples showed simultaneous presence of 3 types of *P. cerevisiae* colonies, with a high proportion of slimy variants causing ropiness. Pure cultures of these tetrad-forming cocci grew best under reducing conditions and were stimulated by CO_2. Glucose, maltose, fructose and saccharose produced slime, and well-buffered media produced higher viscosities. Stirring the cultures in the presence of air completely destroyed the viscosity. Mixed culture experiments with *P. cerevisiae* and yeasts suggested that growing cells of *Brettanomyces* strains can hydrolyse the slime. Paper chromatographic analysis showed that hydrolysates of purified slime preparations were composed of carbohydrates, nucleic acids and proteins. Glucose, mannose and a small amount of ribose were the only sugars, and the nucleic acid was RNA. AS

128

Influence of lactic acid bacteria on beer production.
(In *'Abstracts of the XII International Congress of Microbiology'* [see FSTA (1980) 12 10B73].) [Lecture]
Enari, T.-M.; Haikara, A.
p. 20 (undated) [En] [Biotech. Lab., Tech. Res. Cent. of Finland, Helsinki, Finland]

Lactic acid bacteria most often encountered in brewing are *Lactobacillus* or *Pediococcus* spp., usually as contaminants producing off-flavours, especially diacetyl. *Lactobacillus delbrücki* cultures, however, may be used to lower wort pH where addition of acids is forbidden by law, and *Pediococcus* spp. are important constituents of some Belgian beers produced by spontaneous fermentation. Most common homofermentative lactobcacilli found as beer spoilage organisms are *L. casei, L. plantarum* and *L. coryniformis;* most common heterofermentative spp. are *L. brevis, L. fermenti* and *L. buchneri.* DIH

129

[The microflora of sourdough. IX. Comparative investigations of performance of lactic acid bacteria (Genus *Lactobacillus* Beijerinck) occurring in starter cultures ('Reinzuchtsauer').] Die Mikroflora des Sauerteiges. IX. Vergleichende Untersuchungen über die Säuerungsleistung der in 'Reinzuchtsauern' auftretenden Milchsäurebakterien (Genus *Lactobacillus* Beijerinck).
Spicher, G.; Schröder, R.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 170 (4) 262–266 (1980) [8 ref. De, en]
[Bundesforschungsanstalt für Getreide- und Kartoffelverarbeitung, Schützenberg 12, D-4930 Detmold 1, Federal Republic of Germany]

Homo- and heterofermentative lactic acid bacteria of subgenus *Thermobacterium, Streptobacterium* and *Betabacterium*, isolated from starter cultures (Reinzuchtsauer), were examined by comparing them in an acidification test. They were used in this test after enrichment in a rye-bran-extract broth (30°C/24 h) and preculture in a rye flour dough with a dough yield of 200 (30°C/24 h). Under the conditions used (3-stage-sour-dough-method, Detmolder 1-stage-sour-dough-method, Berliner short-sour-dough method) the sour dough bacteria of different types showed varying effects. But they all differed in the acidification process from spontaneously leavened dough. The sour dough bacteria *Lactobacillus brevis var. lindneri* produced acidification equivalent to the starter culture Reinzuchtsauer under all sourdough conditions (in pH lowering as well as dough acidity increase). Under conditions of the Detmolder 1-stage-sour-dough-method *L. brevis* and *L. fructivorans* also produced sufficient acidification. When preparing the sour-dough as the Berliner short-sour dough, besides *L. brevis var. lindneri*, only *L. fructivorans* showed sufficient acid development. [See FSTA (1980) 12 7M810 for part VII.] AS

130

Action of bacteriophages on lactic acid bacteria: consequences and protection.
Lawrence, R. C.
Milk Industry 80 (10) 22–26 (1978) [26 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]
See FSTA (1979) 11 6P1033.

131

Survival of *Lactobacillus acidophilus* in a spray-drying process.
Espina, F.; Packard, V. S.
Journal of Food Protection 42 (2) 149–152 (1979) [16 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]
A frozen concentrate of *L. acidophilus* was used as inoculum for dried skim milk reconstituted to 25 and 40% TS. Initial count of the 2 milks was 1.2×10^9 and 7.0×10^8 colony forming units/g DM resp. Sublots of these 2 concentrates were spray-dried at 85°, 80° and 75°C exit air temp. in a Coulter/Townley pilot drier (vertical, venturi nozzle spray system). Survival of *L. acidophilus* was greatest at the lowest air outlet temp. investigated, and in the milk with a lower TS content. At 75°C air exit temp. the count following drying was 2.6×10^7/g DM at 25%. Survival after 30 days storage under N_2 at 4°C was 1.29 and 4.17% resp., for milks with 25 and 40% TS. AS

132

Chr. Hansen's laboratory has begun industrialized manufacture of deep frozen starter cultures.
Hansen, R.
Nordeuropaeisk Mejeri-Tidsskrift 45 (3) 55–60, 65 (1979) [En, Da, De]
Chr. Hansen have opened a new factory at Milwaukee, USA for the production of various Direct Vat Set (DVS) cultures which are canned, highly conc. deep frozen lactic acid cultures for direct addition to the milk vat. Several week's supply is stored at each cheese plant at ≤ −28°C and added to the milk vat at one 360 ml can/2272 kg milk (equivalent to 1% normal starter culture). Milk is ripened for 45–60 min. Use of these cultures obviates the existing starter culture system, resulting in savings in cost and space, and eliminates phage contamination. Details of the production system are given. NJH

133

[Fermented milk.] [Review]
Kikuchi, T.
Fermentation and Industry 37 (2) 133–140 (1979) [22 ref. Ja] [Tech. Lab., Yukijirushi Nyugyo Co. Ltd., Japan]
This review briefly traces the modern history of yoghurt, describes its manufacture and discusses its nutritional value. Other lactic fermented milk products described are taette, skyr, ymer and national yoghurt type products of the Middle East; and the lactic and alcohol fermented products koumiss, kefir, and gioddu. BWH

134

[Isolation of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* from commercial yoghurt.]
Moraes, J. M. de; Passos, L. A. S.
Revista do Instituto de Laticinios Candido Tostes 34 (206) 15–17 (1979) [5 ref. Pt] [Inst. de Laticinios Candido Tostes, Juiz de Fora, MG, Brazil]
Procedures are described for isolation and identification of *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. *L. bulgaricus* is isolated by incubation for 2 periods of ≤48 h at 45°C in Rogosa Broth, alternating with 2 periods of incubation on Rogosa Agar. Typical *L. bulgaricus* colonies, kept in sterilized milk + 1% Difco yeast extract, are identified by virtue of their ability to grow in the presence of 2% NaCl, ability to ferment lactose and glucose, and inability to ferment sucrose, rhamnose, mannitol, maltose and arabinose (during 7 days at 37°C). *Str. thermophilus* is isolated by incubation at 37°C, for 2 periods of ≤48 h in Neutral Red-Lactose-Thallium Acetate (NRLTA) Broth, alternating with 2 periods on NRLTA Agar. Typical *Str. thermophilus* colonies, preserved in sterilized milk + 1% yeast extract, are identified by virtue of their growth at 45°C on Yeast-Glucose-Meat Extract Broth, their inability to ferment maltose and their inability to grow in presence of 2% NaCl. These procedures were successfully used to identify both organisms in 7 commercial samples of Brazilian yoghurt. A table shows the acidity produced by the 7 cultures of *L. bulgaricus* after inoculation at 1% in milk with 12% SNF and incubation for ≤6 h at 45°C. Final acidity after 6 h ranged from 96 to 108°D. ADL

135

Characterization of bacteriophages of group N (*lactic*) *Streptococci*. (In *'Abstracts of the XII International Congress of Microbiology'* [see FSTA (1980) 12 10B73].) [Lecture]
Lembke, J.; Lompe, A.; Teuber, M.
p. 145 (undated) [En] [Inst. für Mikrobiol., Bundesanstalt für Milchforschung, D-2300 Kiel, Federal Republic of Germany]
To provide a basis of knowledge of phage-host interactions for selection of phage-resistant starter cultures, the phage spectrum of several dairies was examined with a set of 55 host strains of *Streptococcus lactis*, *S. cremoris* and *S. thermophilus*. Morphological differences were studied by electron microscopy; at least 6 different types of DNA-containing phages were identified. 2 distinct morphological types are commonly isolated from slow-running cheese vats, one with a prolate polyhedral head, and another with an isometric polyhedral head and with a collar and base plate feature on the tail. Guanine + cytosine content of the DNA of these 2 types was 41 and 32%, resp. Host range included members of all 3 streptococcal spp. used; morphologically identical phages did not necessarily have identical host ranges. DIH

136

Characterization of the inhibitory power of *Lactobacillus* of meat origin.
Talon, R.; Labadie, J.; Larpent, J.-P.

Zentralblatt fur Bakteriologie, 1B 170 (1/2) 133–142 (1980) [12 ref. En, de] [Lab. de Microbiol., Inst. de la Viande, INRA, de Theix, Beaumont, France]

28 lactobacilli strains, isolated from sausages, were tested for their inhibitory activity against Gram-negative bacteria (*Escherichia coli, Pseudomonas fluorescens* and *Ps. aeruginosa*). 19 of the lactobacilli inhibited growth of these test microorganisms, whereas no inhibitory activity was detected with 2 lactobacilli isolated from milk (*Lactobacillus casei* and *L. plantarum*). The inhibitory activity was localized within the bacterial cell; it was not caused by the presence of organic acids. Inhibitory activity increased during the exponential growth phase and decreased rapidly during the stationary growth phase; it was inactivated by treatment of the bacterial cells with peroxidase or proteolytic enzymes and appears to be due to peroxides, probably in association with proteins. MEG

137

[Synthetic medium for lactic cultures.]
Grimard, L.
French Patent Application 2 268 073 (1975) [Fr]

A culture medium is described, which is instantly miscible with water, produces rapid acidification, and is ready for use in cheesemaking after 3–5 h incubation. The medium consists of a mixture of whey that has been pre-digested by a porteolytic enzyme of animal or vegetable origin (preferably papain), whey to which incubated *Saccharomyces cerevisiae* yeast has been added, natural yeast and a carbohydrate, preferably glucose. The mixture is buffered to pH 5.9–7.2. The ratio of pre-digested whey to the whey with yeast added is preferably 9:6. W&Co

138

[The malolactic flora of musts and wines from Valais Canton, Switzerland. II. Development of the population of lactobacilli and pediococci during manufacture of Fendant white wine and Dole red wine.]
Maret, R.; Sozzi, T.
Annales de Technologie Agricole 28 (1) 31–40 (1979) [4 ref. Fr, en] [Dep. de Developpement Tech., Soc. d'Assistance Tech. pour Produits Nestle SA, Lausanne, Switzerland]

Studies were conducted on changes in the lactic microflora of Fendant and Dole wines. Must and wine samples were collected at various stages of processing (freshly-pressed must, wine at the end of alcoholic fermentation, wine undergoing malolactic fermentation, wine at the end of malolactic fermentation and, in the case of red wine, must after fermentation on the grape skins), and the lactic acid bacteria were characterized. Tables of results are given. In the musts, homofermentative lactobacilli (especially *Lactobacillus plantarum*) predominate; pediococci are absent. Subsequently, the homofermentative lactobacilli disappear, heterofermentative lactobacilli (*L. brevis* and, especially, *L. hilgardii*) being responsible for malolactic fermentation. *Pediococcus cerevisiae* and *P. pentosaceus* appear during alcoholic and malolactic fermentation, pH and ethanol tolerance of the lactic acid bacteria studied is discussed. AJDW

139

[The malolactic flora of musts and wines from Valais Canton, Switzerland. III. *Leuconostoc.*]
Maret, R.; Sozzi, T.; Schellenberg, D.
Annales de Technologie Agricole 28 (1) 41–55 (1979) [11 ref. Fr, en] [Dep. de Development Tech., Soc. d'Assistance Tech. pour Produits Nestle SA, Lausanne, Switzerland]

Studies on occurrence of *Leuconostoc oenos* in wines from the Valais canton of Switzerland are described. *L. oenos* was detected in samples of Fendant, Riesling × Sylvaner and Johannisberg wines, but not in Pinot Noir or Gamay. The culture requirements, sugar fermentation characteristics, malolactic fermentation activity, optimum temp. and pH for growth, SO_2 resistance and morphology of *L. oenos* isolated from wines were investigated; results are discussed. The role of *L. oenos* in malolactic fermentation of wines is considered. AJDW

140

DNA of phage PL-1 active against *Lactobacillus casei* ATCC 27092.
Watanabe, K.; Takesue, S.; Ishibashi, K.
Agricultural and Biological Chemistry 44 (2) 453–455 (1980) [18 ref. En] [Fac. of Pharmaceutical Sci., Fukuoka Univ., Fukuoka, Japan]

141

[Effects of lower fatty acid monoglycerides on the *Lactobacillus casei*-J1 phage system.]
Murata, A.; Tsukiyama, S.; Kato, F.; Saruno, R.
Hakko Kogaku Kaishi 56 (6) 718–724 (1978) [32 ref. Ja, en] [Lab. of Applied Microbiol. Saga Univ., Saga 840, Japan]

142

[Comparison of characteristics of industrial and newly isolated strains of *Lactobacterium bulgaricum [Lactobacillus bulgaricus]* with regard to their acid production capacity.]
Fleitas, O.; Gruev, P.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 24 (1) 263–273 (1977) [9 ref. Bg, ru, fr] [Vissh Inst. po Khranitelna & Vkusova Promishlenost, Plovdiv, Bulgaria]

6 strains of *Lactobacillus bulgaricus* obtained from various sources (mainly from Bulgarian yoghurt, but including 2 strains from Swedish yoghurt) were cultivated for 96 h at 37–38°C in cows' skim milk, alone or in association with *Streptococcus thermophilus*. It was found that the amount of lactic acid produced by the various *L. bulgaricus* strains depended more on their resistance to acidity than on their specific fermenting activity: differences in acid production between strains were insignificant at the start of cultivation but increased subsequently because some strains were more sensitive to the acid accumulated. Presence of *Str. thermophilus* reduced the coagulation time but did not affect the acid production of *L. bulgaricos*. The 3 strains of *L. bulgaricus* which were most sensitive to acid were selected as being the most suitable for production of "sweet" yoghurt by rapid methods. ADL

43

sterases of lactic streptococci and their stability in heese slurry systems.
larper, W. J.; Carmona de Catril, A.; Chen, J. L.
Milchwissenschaft 35 (3) 129–132 (1980) [18 ref. En, e] [Dep. of Food Sci. & Nutr., Ohio Agric. Res. & Development Cent., Wooster, Ohio, USA]

4 separate esterases were noted when cell-free xtracts from Elliker's broth cultures of (i) *Streptococcus lactis* C10, (ii) *Str. lactis* C2, (iii) *Str. cremoris* C13, (iv) *Str. cremoris* US3 and (v) Hansen No. 4 mixed strain lactic culture were assayed for ctivity on α-naphthyl acetate substrate using olyacrylamide disc electrophoresis. Only 1 esterase (Rf value 0.60) was common to all 5 cultures, and it was the only esterase detected in (iii) and (iv); level of activity of his esterase ranged from 22 units (determined by densitometric analysis of the gels) in (i) to 90 units in iv), but treatment with glutathione (GSH) affected this activity so that it became nearly the same (75–90 units) in all 5 cultures. Cheddar cheese slurries made with the cultures showed esterase activity in the Rf 0.6 zone only. GSH-treated slurries retained higher esterase activity throughout ripening whilst this activity decreased after 1–3 days in controls without GSH. There appeared to be a relationship between esterase activity and flavour development. CDP

144

[Determination of characteristics of lactic acid bacteria in foods. I. Evaluation of solid media for counting pure cultures.]
Geraldini, A. M.; Delazari, I.; Leitao, M. F. de F.; Oliveira, C. M. M. de; Uboldi Eiroa, M. N.
Boletim do Instituto de Tecnologia de Alimentos, Brazil **16** (1) 53–64 (1979) [22 ref. Pt, en] [Inst. de Tecnologia de Alimentos (ITAL), Campinas, Sao Paulo, Brazil]

7 media for counting lactic acid bacteria were tested on the following species: *Lactobacillus brevis, L. plantarum, L. mali, L. delbrueckii, L. bulgaricus, L. acidophilus,* and *Lactobacillus* spp.; *Streptococcus faecalis, Str. liquefaciens, Str. lactis, Str. diacetilactis, Str. cremoris* and *Streptococcus* spp.; *Pediococcus cereviseae* and *Pediococcus* spp.; *Leuconostoc cremoris* and *Leuc. mesenteroides.* Cultures were incubated for 72 h at 30 or 35°C on suitable maintenance media; dilutions were then prepared from suspensions of 10^6–10^8 cells/ml, and portions of 0.1 ml were inoculated into Petri dishes to which the various counting media were subsequently added (pour-plate technique). After solidification, the media were covered with plain agar and incubated at 30°C. Colonies were counted daily from the 3rd to 7th day. Best results were obtained with Orange Serum Agar (Difco Laboratories, Detroit), which gave optimal growth of all species after short periods of incubation. Elliker Lactic Agar and APT Agar also gave good results, but with less intense growth of certain species such as *Leuc. mesenteroides* and *L. mali.* Lee's Agar, [see FSTA (1974) 6 12P1823] gave good counts of all species except *Leuc. mesenteroides,* which did not grow at all on this medium. Acidified MRS (Man-Rogosa-Sharpe) medium, pH 5, gave excellent results for some species but poor results for others (e.g. *L. acidophilus* and *Str. cremoris*). NAP Agar (with nitrite, actidione and polymyxin) was found suitable only for lactobacilli and streptococci. Rogosa SL Agar inhibited many of the species. ADL

145

The activity and viability of *Streptococcus lactis* growing on soymilk medium.
Farahat, S. M.; El-Ela, W. M. A.; Guirgvis, A. H.; El-Neshawy, A. A.; El-Fak, A. M.
Annals of Agricultural Science, Moshtohor **10**, 111–117 (1978) [16 ref. En, ar] [Food Sci. Dep., Zagazig Univ., Mostohor, Tukh, Egypt]

The potential of soy milk as a replacement medium for growth of starter cultures of *Streptococcus lactis* was investigated using soy milk/skim milk blends (0, 20, 40, 60, 80 and 100% soy milk), and also soy milk supplemented with 1, 2, 3 or 4% lactose. Analyses for total acidity, activity and total viable count were carried out after incubation at 30°C for 0, 4, 8, 12, 20 and 24 h. Up to 40% replacement with soy milk stimulated growth and acid production, as did lactose fortification of the soy milk medium, with 3% being the optimum. JRR

146

[Manufacture of pretzels using concentrated starter with lactic acid bacteria.]
Ivanova, N. I.; Burtseva, N. A.; Patrashkov, E. Ya.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 10, 14 (1979) [Ru] [Kalininskii Khlebokombinat, Kalinin, USSR]

The conc. starters contain a pure culture of *Lactobacillus plantarum*-30; fermentation takes place for 8–18 h at 36–39°C, and the final acidity is 15–20°. Recipes for conc. starter (for 100 kg) and the dough are given. Dividing, proving and baking are carried out normally. Conc. starter reduces the duration of the technological process (2.5 ×) and the consumption of DM for fermentation (by 0.5%), and eliminates sponge preparation. STI

147

Improved medium for detection of citrate-fermenting *Streptococcus lactis* subsp. *diacetylactis.*
Kempler, G. M.; McKay, L. L.
Applied and Environmental Microbiology **39** (4) 926–927 (1980) [11 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

A simplified medium, based on that described in *Antonie van Leeuwenhoek* (1952) 18, 275, contains 1% dried skim milk, 0.25% milk protein-hydrolysate peptone, 0.5% glucose and 1.5% agar at pH 6.6. After sterilization, the agar medium is tempered at 45°C and 10 ml each of solutions of 10% $K_3Fe(CN)_6$ and of ferric citrate + sodium citrate (1 g each/40 ml) were added/l. After incubation of surface inoculated plates at 32°C for 48 h under anaerobic conditions, citrate-fermenting strains showed up as blue colonies and non-citrate fermenting strains as white colonies. The flavour and aroma of many fermented dairy products are dependent upon microorganisms that synthesize diacetyl. The medium described is useful for isolating strains that ferment citrate, which is a precursor of diacetyl. It can

also be used to distinguish *Str. lactis* subsp. *diacetylactis* from other lactic streptococci in mixed strain starters. MEG

148

Degradation of organic acids by dairy lactic acid bacteria.
Hegazi, F. Z.; Abo-Elnaga, I. G.
Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, II 135 (3) 212–222 (1980) [23 ref. En, de] [Dairy Dep., Univ. of Assiut, Assiut, Egypt]

112 strains of lactic acid bacteria (including *Leuconostoc, Streptococcus* and *Lactobacillus* spp.) were examined for their ability to degrade 10 organic acids (citric, fumaric, gluconic, glutaric, malic, mucic, 2-oxoglutaric, pyruvic, succinic and tartaric acids). None of the strains degraded succinic, glutaric, 2-oxoglutaric or mucic acids. The other acids were broken down to different extents; *Str. cremoris* differed from other streptococci in not producing CO_2 from gluconic acid, and only *L. plantarum* formed CO_2 from tartaric acid. Homofermentative lactobacilli and *Leuc. citrovorum [Leuc. cremoris]* produced acetoin and diacetyl from pyruvate, whereas heterofermentative lactobacilli did not. MEG

149

[Preparation and use of cultures for Lyubitel'skii beverage.]
Pyatnitsyna, I. N.; Bannikova, L. A.; Zadoyana, S. B.
Molochnaya Promyshlennost' No. 9, 17–19 (1979) [Ru] [Vses. Nauchno-Issled, Inst. Molochnoi Promyshlennosti, Moscow, USSR]

The suitability of various cultures for the manufacture of Lyubitel'skii beverage was studied with 11 strains of *Streptococcus diacetilactis* and 33 mucilaginous *Str. thermophilus* strains, used singly or as a mixed culture. The results showed that the optimum ratio of *Str. thermophilus* to the aroma-producing *Streptococcus,* giving a product of the desired viscosity and aroma, was 1:4. Methods for the preparation of starters and of the beverage were then determined. Dried starters are at present supplied to 115 plants producing Lyubitel'skii beverage. FL

150

[Concluding study on manufacture of Minas Frescal cheese by different processes.]
Furtado, M. M.; Wolfschoon-Pombo, A. F.; Munck, A. V.; Souza, H. M. de
Revista do Instituto de Laticinios Candido Tostes 35 (208) 13–16 (1980) [6 ref. Pt] [Inst. de Laticinios Candido Tostes, Juiz de Fora, Minas Gerais, Brazil]

Minas Frescal fresh cheese made from pasteurized milk (i) in the traditional manner with 1.5% *Streptococcus lactis/Str. cremoris* starter, (ii) without starter, and (iii) with 85%-pure industrial lactic acid added at 23.5 ml/100 l milk instead of starter, contained 59.1, 62.76 and 61.1% moisture resp., with cheese yields of 16.4, 17.98 and 19.05%. The pH decreased from 5.2, 6.45 and 6.39 resp. on the 1st day after manufacture to 4.87, 5.52 and 5.45 by the 6th day. Cheese made with starter had a fragile texture and very acid flavour on the 6th day, whereas the other cheeses had a firm texture and less acid flavour. The whey from cheeses (i)–(iii) resp. contained 7.1, 7.53 and 7.2% solids. It is concluded that use of industrial lactic acid instead of starter presents major advantages in terms of cheese yield, cheese quality and economics. ADL

151

Distribution of β-galactosidase and β-phosphogalactosidase activity among lactic streptococci.
Okamoto, T.; Morichi, T.
Agricultural and Biological Chemistry 43 (11) 2389–2390 (1979) [4 ref. En] [Nat. Inst. of Anim. Ind., Chiba-shi, Japan]

The levels of β-galactosidase (β-gal) and β-phosphogalactosidase (β-Pgal) activity varied among 40 strains of lactic streptococci maintained at the authors' Institute, but all strains showed considerably higher β-Pgal than β-gal activity; 7 strains showed no β-gal activity. No correlation was found between levels of these enzymes and acid-producing ability. MEG

152

[Folate contents in milk.]
Yamada, M.
Vitamins [Bitamin] 53 (5/6) 221–227 (1979) [Ja, en] [Lab. of Nutr., Niigata Women's Coll., Niigata 950, Japan]

Folate contents in samples obtained from cows' milk and human milk were determined by a microbiological assay method with *Lactobacillus casei* ATCC 7469 as a test organism. For preparation of sample solution from each material, an improved technique by pretreatment with protease was employed throughout this study. Free and total folate contents in market milk and human milk estimated by the improved method amounted to 120–190% of those obtained by the ordinary method. After heating at 100°C for 5 min, however, free folate activities in cows' milk decreased to some degree. Total folate content was in raw milk 115.1 ± 28.1 μg/l, in UHT (130°C for 2 s) milk 118 ± 53.2 μg/l, and 115 ± 45.3 μg/l in market milk. These results strongly suggest that cows' milk, whether fresh or processed, has almost the same folate level and a very wide range in the concn. of the vitamin. AS

153

Production of *Lactobacillus* cells by dialysis continuous fermentation of deproteinized whey.
Stieber, R. W.; Gerhardt, P.
Journal of Dairy Science 63 (5) 722–730 (1980) [16 ref. En] [Dep. of Microbiol. & Public Health, Michigan State Univ., East Lansing, Michigan 48824, USA]

A mathematical model was used to simulate the continuous conversion of deproteinized sweet cheese whey into *Lactobacillus bulgaricus* cells. The theoretical predictions were tested experimentally as described in FSTA (1979) 11 4P563. The prediction that cell mass accumulation in a dialysis continuous process would exceed that from a non-dialysis continuous process was confirmed experimentally. Dialysis has the advantages of enabling a concentrated substrate to be used, and of removing inhibitory metabolic products from the

fermentor; disadvantages of the system are the high cost and complexity of equipment, membrane fouling and production of large quantities of dilute permeate. [See also FSTA (1978) 10 7P883 & 7P884.] MEG

154

[Methods for the enumeration, isolation and identification of *Streptococcus thermophilus* in dairy products.]
Ottogalli, G.; Galli, A.
Annali di Microbiologia ed Enzimologia 28, 91–110 (1978) [30 ref. It, en] [Istituto di Microbiol. Agraria & Tecnica, Univ. of Milano, Milan, Italy]

137 streptococci strains from collections and 203 isolated from milk, dried milk, yoghurt or cheese were examined; most were *Str. thermophilus*. Growth on caseinate/whey agar (CWA) at 45°C, particularly in anaerobic conditions, differentiated the thermophilic from the mesophilic streptococci. Counts are given of 5 strains of *Str. thermophilus* after anaerobic or aerobic incubation at 45°C on 15 media. Thermophilus streptococci can be differentiated from faecal streptococci on tyrosine/triphenyltetrazolium agar (TTA) without or with starch (TTAS) [FSTA (1979) 12 1P79]. Results of cultural, physiological and serological tests are tabulated for 11 strains of thermophilic streptococci [FSTA (1979) 11 4P584]. Recommended methods for counting, isolation into litmus milk and identification of *Str. thermophilus* are tabulated. For milk and dried milk, with counts usually $< 10^2$/ml, CWA under anaerobic or TTA under aerobic conditions are recommended. For starters and Italian cheese, with usually high counts $> 10^7$/g, CWA or TTAS can be used; aerobic incubation on TTA or tryptone/yeast extract/sucrose agar is recommended for pure cultures or for yoghurt. The authors propose modified terminology, including changing Lactobacillaceae to Lactobacteriaceae to include the 2 genera *Lactobacillus* and *Lactococcus*, the latter to include the subgenera *Streptococcus, Leuconostoc* and *Pediococcus*. JMD

155

The use of *Streptococcus cremoris* strains cured of diplococcin production as cheese starters.
Davey, G. P.; Pearce, L. E.
New Zealand Journal of Dairy Science and Technology 15 (1) 51–57 (1980) [15 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

A new type of cheese starter was obtained by curing strains of *Streptococcus cremoris* of their ability to produce the antibiotic diplococcin. Diplococcin negative (Dip^-) variants from *S. cremoris* 346, 378 and 486 were stable, and showed no change in activity or detectable differences in phage sensitivity from the respective parent strains. A Dip^- isolate from *S. cremoris* 346 has been used in a paired starter for commercial cheesemaking. Standard methods are described for more effective laboratory screening of new starters for antibiotic production. AS

156

Characters of *Lactobacillus coryniformis*, isolated from an Iraqi cheese.
Hegazi, F. Z.; Abo-Elnaga, I. G.
Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, II 135 (3) 205–211 (1980) [25 ref. En, de] [Dairy Dep., Univ. of Assiut, Assiut, Egypt]

21 strains of *L. coryniformis* were isolated from 8 out of 9 samples of Iraqi Biza cheese, which is a semi-hard cheese containing approx. 10% green foliage of wild garlic. Cultural, physiological and biochemical characteristics of the strains are described. None of the strains contained diaminopimelic acid in the cell walls, and none grew in MRS broth + 4% taurocholate. 15 different sugar fermentation patterns were found among the strains. The isolates degraded pyruvate in the presence of glucose giving lactate as the major product together with acetate, ethanol, acetoin and diacetyl. Differences between *L. coryniformis* and the closely related species, *L. plantarum*, are discussed. MEG

157

[Characteristics of lactic acid bacteria in natural whey cultures. V. Acid phosphatase in thermophilic lactic acid bacteria.]
Bersani, C.; Bottazzi, V.
Annali di Microbiologia ed Enzimologia 28, 57–61 (1978) [8 ref. It, en] [Istituti di Microbiol., Univ. Cattolica, Piacenza, Italy]

Acid phosphatase was estimated from the hydrolysis of *p*-nitrophenyl phosphate at pH 5.2 in 20 strains of thermophilic organisms, including 2 of *Lactobacillus lactis*, 6 of *L. helveticus* and 5 of *L. fermentum* isolated from whey cultures. Using freeze-dried cells, *L. fermentum* showed the highest activity, 89–127 µmol *p*-nitrophenol/mg cell protein, followed by *L. helveticus* (40–58), *L. lactis* (27–75) *L. bulgaricus* (16–29) and *Streptococcus thermophilus* (13–20). After incubating the cells in milk for 24 h, the *L. helveticus* strains showed the highest activity, 18–32 µmol *p*-nitrophenol/10 ml milk, followed by *L. fermentum* (10–22), *L. lactis* (9–42). *L. bulgaricus* (12–20) and *Str. thermophilus* (2–3), but these results are affected by the strains' ability to develop in pure culture in milk. The acid phosphatase is likely to have a role in hydrolysing phosphoseryl residues in casein, which might otherwise inhibit proteolysis. Acid phosphatase activity is an added criteria for the selection of strains of *L. helveticus* for whey starters to encourage faster ripening of Grana and other cheeses. [See FSTA (1979) 11 8P1374 for part IV.] JMD

158

Method for producing foods and drinks containing bifidobacteria.
Mutai, M.; Mada, M.; Shimada, K. (Yakult Honsha Co. Ltd.)
United States Patent 4 187 321 (1980) [En]

Milk is inoculated with a mixed culture of viable bifidobacteria containing at least one oxygen-resistant

mutant strain of *Bifodobacterium* and at least one obligatory anaerobic strain of *Bifidobacterium*. After incubation under aerobic conditions at 37°C for 20 h the resultant mixture may be freeze-dried. The presence of the oxygen-resistant strain enables the obligatory anaerobic strain to grow under aerobic conditions in a pure milk medium without the addition of growth promoting substances. The product may be used as an infant food as well as a food for children and adults. EJM

159

[Development of suitable protective agent during freeze-drying of pure cultures for the meat industry.]
Popova, Yu.
Khranitelna Promishlenost 28 (10) 14–18 (1979)
[35 ref. Bg]

To protect bacterial starters against cold shock during freeze-drying and subsequent frozen storage, 12 different protective agents (e.g. sugars, dried skim-milk with and without glutamic acid, glycerol) were used in conjunction with pure starter cultures of *Lactobacillus plantarum* strain L_4 and *Micrococcus varians* strain M_{95}. The cultures were tested in liquid, freeze-dried and frozen states; additionally, the freeze-dried forms were tested after 1, 3 and 6 months storage in vacuum phials or test-tubes at 20–22° and 3–5°C. The tests covered bacterial count and % survival. Results (tabulated) showed that dried skim-milk (without glutamic acid) gave the best protection, with good results also being obtained with sucrose, peptone and some combined media. Satisfactory storage life was up to 6 months in the vacuum phials at 3–5°C. HBr

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FAB 31

LACTIC ACID BACTERIA IN BEVERAGES AND FOOD

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H. BROOKES

EDITOR

1

[Determining the activity of starter cultures (pure lactobacilli).] Untersuchungen zur Aktivitätsbestimmung von Starterkulturen (Laktobazillen-Reinkulturen).
Junker, M.; Liepe, H.-U.
Fleischwirtschaft 59 (12) 1880–1881 (1979) [12 ref. De, en] [Fa. Rudolf Müller & Co., Giessener Strasse 94, 6301 Pohlheim 1, Federal Republic of Germany]

A simple and reproducible method is described for determining the activity of a starter culture via the rate of breakdown of glucose to lactic acid. Using a strain of *Lactobacillus plantarum* (widely used in dry sausage manufacture), the change in pH due to lactic acid formation, determined by simple titration, gave a straight-line time relationship over 30 min. Optimum conditions for enzyme action were pH 7.0 and 37°C. RM

2

Reduction of nitrate and nitrite in foods by lactic acid bacteria. (In '*Proceedings from the first biennial Marschall International Cheese Conference*' [see FSTA (1981) 13 1P59].) [Lecture]
Speck, M. L.
pp. 387–390 (undated) [8 ref. En] [Dep. of Food Sci. & Microbiol., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Sources of nitrates and nitrites (precursors of nitrosamines) in human nutrition are outlined and the role of lactic acid bacteria in the reduction of these compounds in cheese and bacon is discussed. Finally, the possibility of the involvement of lactobacilli in the prevention of nitrosamine formation in the intestinal tract is indicated. FL

3

[Nutritional requirement of hiochi-bacteria in high ethanol concentration. VII. Separation of peptides from yeast extract.]
Higashi, K.; Takeda, M.; Tsukahara, T.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 74 (8) 555–557 (1979) [11 ref. Ja, en] [Tokyo Univ. of Agric., Setagaya, Tokyo, Japan]

2 peptides having growth promoting effects on *Lactobacillus heterohiochii* No. 59 were purified from a yeast extract. They consisted of either methionine or glutamic acid or both. [See FSTA (1979) 11 6H899 for part VI.] YN

4

[Alteration of carbohydrate and amino acid composition of beer caused by lactobacilli and pediococci.] Veränderung der Kohlenhydrate- und Aminosäurenzusammensetzung von Bier durch Lactobacillen und Pediococcen. [Lecture]
Pfenninger, H. B.; Schur, F.; Anderegg, P.; Schlienger, E.
Proceedings, European Brewery Convention pp. 491–504 (1979) [22 ref. De, en, fr] [Versuchssta. Schweizerischer Brauereien, Zürich, Switzerland]

Effects of beer spoilage microorganisms i.e. *Lactobacillus casei, L. brevis, L. plantarum* and *Pediococcus cerevisiae* on sugar, dextrin and amino acid composition of beer were studied. Results, presented in histograms and tables, showed that not all beer-spoilage lactic acid bacteria examined were in a position to utilize malto-, oligo- and poly-saccharides. Maltose was fermented by all strains tested. Certain amino acids were preferentially assimilated by the bacteria studied. [From En summ.] [See FSTA (1981) 13 1H6.] SP

5

[Process for preparing starters for bread.]
Kazanskaya, L. N.; Afanas'eva, O. V.; Gurina, O. F.; Pavlovskaya, E. N.; Vasil'eva, A. I.; Kuznetsova, L. I.; Sinyavskaya, N. D.; Patt, V. A.; Blant, M. E.; Komarova, N. A.; Yakimycheva, E. A. (**Union of Soviet Socialist Republics**, Vsesoyuznyi Nauchno-issledovatel'skii Institut Khlebopekarnoi Promyshlennosti; **Union of Soviet Socialist Republics**, Leningradskoe Otdelenie Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Khlebopekarnoi Promyshlennosti)
USSR Patent 730 334 (1980) [Ru]

The process involves fermenting an aqueous farinaceous mixture with a pure lactobacillus culture, adjusting the mixture to a determined acidity and collecting the starter. To accelerate the process, the pure lactobacillus culture used is a freeze-dried mass of active bacteria, which, prior to addition to the aqueous farinaceous mixture, is diluted with an equal vol. of boiling water to a temp. of 35–37°C, and allowed to stand for 7–8 min. W&Co

6

[Effect of culture composition on production and quality of acidophilus milk.]
Svigir-Varga, S.
Mljekarstvo 29 (6) 128–132 (1979) [10 ref. Sh] ['Dukat', Zagreb, Yugoslavia]

The Zagreb dairy factory has been producing acidophilus milk since 1969 under the name 'Acidofil'. Methods of selecting the most suitable strain of *Lactobacillus acidophilus* and of determining optimal cultural conditions are outlined. SKK

7

Antibacterial activity of skim milks fermented with lactic bacteria.
Amster, H.; Jost, R.
International Journal for Vitamin and Nutrition Research 50 (2) 209–210 (1980) [3 ref. En] [Nestle Res. Lab., 1814 La Tour-de-Peilz, Switzerland]

Methanol-acetone extracts and deproteinized whey concentrates from cultures of *Lactobacillus acidophilus*, *L. bulgaricus* and *Streptococcus thermophilus*, grown in skim milk, were examined for antibacterical activity in disk diffusion assays, using *Escherichia coli*, *Pseudomonas fluorescens* and *Staphylococcus aureus* as test organisms. Growth inhibition was shown to be due to lactic acid in the extracts. MEG

8

[Blowing of film-packaged Trappist cheese.]
Sutic, M.; Markovic, D.; Davitkov, A.
Mljekarstvo 29 (6) 122–128 (1979) [7 ref. Sh]
[Poljoprivredni Fak., Belgrade, Yugoslavia]

3 specimens of blown vacuum-packaged Trappist cheese, 50–55 days old, were examined. Odour and taste were pleasant, reminiscent of fresh curd. Bacteriological examination showed total counts of 218–1256 million/g, lactobacilli counts of 153–663 million/g, and coli-aerogenes bacteria at $>10^6$/g; no clostridia were detected. It is considered that cheese ripening was delayed and that the microflora was typical of cheese aged 10 days in conformity with the organoleptic findings. On selective media, the coli-aerogenes bacteria were identified as a strain of *Escherichia coli* vigorously producing gas, but weak in acid production. The strain is considered responsible for the blowing; and its excessive development in the blown cheeses is linked with the inhibitory effect of aflatoxin, detected in these cheeses but not in controls, on acid formation by lactic acid bacteria. SKK

9

Temperature relations in Emmentaler type cheese.
(In *'Proceedings from the first biennial Marschall International Cheese Conference'* [see FSTA (1981) 13 1P59].) [Lecture]
Gehriger, G.
pp. 369–386 (undated) [7 ref. En] [Zentralstelle MKBD (Extension Service), Forelstrasse 1, 3072 Ostermundigen, Switzerland]

Measurements were made of changes in the temp. of Emmental cheeses during pressing. After 1 h, temp. differences of 5°C occurred within the cheese. Heat losses depended primarily on the temp. of the press room, and in non air-conditioned press rooms the outside temp. was an important factor. Experimental cheeses, made in a press room controlled at 10°, 20°, 30°, 40° and 50°C, were examined for temp. changes at the centre and edges and for lactic acid contents at different times during pressing. For uniform cooling of the cheese mass and optimum growth of lactic acid bacteria, the temp. of the press room should be 20–30°C. Temp. of 10°, 40° or 50°C caused the cheese to cool too slowly or too fast, resulting in an inhibition of the growth of lactic acid bacteria, unsatisfactory removal of whey and other defects. MEG

10

Thermal shocking of bacteria for high flavor development in the manufacture of Cheddar cheese.
(In *'Proceedings from the first biennial Marschall International Cheese Conference'* [see FSTA (1981) 13 1P59].) [Lecture]
Somkuti, G. A.; Thompson, M. P.; Flanagan, J. F.
pp. 219–225 (undated) [2 ref. En] [E. Reg. Res. Cent., USDA, Agric. Res., Sci. & Education Administration, 600 E. Mermaid Lane, Philadelphia, Pennsylvania 19118, USA]

Previously it has been shown that several enzymes involved in the development of desirable flavour and physical characteristics of cheese survive heat treatment of *Streptococcus cremoris* cells [see FSTA (1980) 12 2P272]. In tests in which low-fat Cheddar cheese was manufactured, a paste of *Str. cremoris* cells was dispersed in 200 gal of 2% fat milk, yielding a final count of 10^7 colony forming units (cfu)/ml. The milk was t shocked at 64°C for 16 s, cooled and a mixed strain direct-to-vat starter added at 10^7 cfu/ml, giving a total count of live and heat-shocked cells of 2×10^7 cfu/ml. Control and experimental cheeses had similar fat, moisture and salt contents, but after 3 months ripening, the experimental cheeses had higher free fatty acid contents (particularly C2, C4 and C6 acids) and had a more mature flavour than control cheeses; no lipolytic flavour was detected. Results demonstrate that thermal shocking of lactic acid cultures leaves the bulk of proteolytic and lipolytic enzymes intact and that such cultures may be used for developing mature Cheddar flavour in reduced-fat cheese. MEG

11

Method for diacetyl flavour and aroma development in creamed Cottage cheese.
Vedamuthu, E. R. (Microlife Technics Inc.)
United States Patent 4 191 782 (1980) [En]

Streptococcus diacetilactis is cultured in a medium containing dried skim milk and/or casein digest, yeast, citrate and lactose in such proportions as to produce a yield of 10^9 *Str. diacetilactis* cells/ml under the required time/temp. conditions. The bacterial concentrate is added directly to the cooled creaming mixture which, in turn, is added to the cooled Cottage cheese curd at refrigeration temp. EJM

12

[Conditions of biosynthesis of nisin with lactic fermentation streptococci during continuous cultivation.]
Krasnikova, L. V.; Vasil'ev, N. F.; Sileva, M. N.; Voronina, L. N.; Litvinova, M. N.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 5, 35–37 (1979) [10 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, Leningrad, USSR]

Optimal conditions for continuous cultivation of *Streptococcus lactis* 24 were studied to ensure rapid growth of the culture and max. synthesis of the antibiotic. *Str. lactis* 24 was cultivated in whey with 10% enzyme-hydrolysed milk. STI

13

Bitterness development in Cheddar cheese: effect of the level of starter proteinase.
Mills, O. E.; Thomas, T. D.
New Zealand Journal of Dairy Science and Technology 15 (2) 131–141 (1980) [32 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Cheddar cheeses were manufactured by conventional commercial methods except that the starter cultures used (*Streptococcus cremoris* strains 108, 104 and P_2 and *Str. lactis* strains H_7 and ML_8) were adjusted to contain different proportions of proteinase-positive (Prt+) and proteinase-negative (Prt−) variants. Control cheeses were made with 100% Prt+ strains. At

salting, cell densities in the curd were similar for control and experimental cheeses and were independent of the proportions of the 2 types of cells present. As the proportion of Prt— cells in the starter increased, there was an increase in the cheesemaking time, particularly in the dry-to-salt time. In 6 trials, the experimental cheeses were significantly less bitter than the control cheeses, while in the other 3 trials there were no differences between the cheeses. Use of cultures containing a high proportion of Prt— cells may be a practical method for reducing bitterness in cheese. MEG

14

Inhibition of botulinum toxin formation in bacon by acid development.
Tanaka, N.; Traisman, E.; Lee, M. H.; Cassens, R. G.; Foster, E. M.
Journal of Food Protection 43 (6) 450–457 (1980) [17 ref. En] [Food Res. Inst., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

Lactobacillus plantarum, as a producer of lactic acid, and sucrose as a fermentable carbohydrate were evaluated for use in lowering the amount of, or eliminating sodium nitrite in bacon. This work was limited to effect on antibotulinal properties. Organoleptic effects were not considered. Slices of bacon were inoculated with spores of *Clostridium botulinum* types A and B with or without simultaneous inoculation with a culture of *L. plantarum*, vacuum-packaged and incubated at 27°C. Samples were taken after various periods of incubation and assayed for botulinal toxin. It was found that sodium nitrite alone, at 120 p.p.m., did not give bacon extended protection against development of botulinum toxin if a fermentable carbon source (sucrose in these instances) was not present; without added lactic acid bacteria, the effectiveness of 120 p.p.m. of sodium nitrite plus sugar was variable and depended upon growth of naturally contaminating bacteria and lactic acid bacteria with an adequate amount of sucrose gave good protection against development of botulinal toxin. Upon temp. abuse, acid was produced and growth of *C. botulinum* was inhibited. Because the protective properties against development of botulinal toxin in the sugar-lactic acid bacteria system were not dependent on the presence of nitrite, nitrite can be lowered to the level necessary to make organoleptically acceptable products without sacrificing safety, thus less nitrosamine formation may be achieved. AS

15

Effect of high concentrations of carbon dioxide on growth rate of *Pseudomonas fragi, Bacillus cereus* and *Streptococcus cremoris*.
Enfors, S. O.; Molin, G.
Journal of Applied Bacteriology 48 (3) 409–416 (1980) [17 ref. En] [Tech. Microbiol., Chemical Cent., S-220 07 Lund, Sweden]

Max. specific growth rates of *Ps. fragi, B. cereus* and *Strep. cremoris* were studied over a wide rage of CO_2 concn. Growth rate, compared with a control, was reduced to 50% in *Ps. fragi* at 0.5 atm CO_2, in *B. cereus* at 1.3 atm and in *Strep. cremoris* at 8.6 atm. *B. cereus* and *Strep. cremoris* were completely inhibited at 3 and 11 atm CO_2, resp. Growth rate of the aerobic *Ps. fragi* at 0.99 atm CO_2 (0.01 atm O_2) was reduced to about 20% of that in air. Growth rate of *Ps. fragi* was decreased at O_2 concn. <0.01 atm. When *Ps. fragi* was grown at O_2 limitation (0.0025 atm O_2) and exposed to 0.99 atm CO_2, the inhibiting effect of the CO_2 was added to that of the O_2 limitation. No indications of a synergistic effect between CO_2 inhibition and O_2 limitation were noted. *B. cereus* and *Strep. cremoris* were tested under anaerobic conditions. AS

16

Metabolic activities of *Lactobacillus brevis*. Effect of pH, glucose and butane-2,3-diol.
Hieke, E.; Vollbrecht, D.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 171 (1) 38–40 (1980) [10 ref. En, de] [Max von Pettenkofer-Inst. des Bundesgesundheitsamtes, Bundesgesundheitsamt, Postfach D-1000 Berlin 33]

The effect of pH on the metabolic activities of *Lactobacillus brevis* was studied. Significant changes in the patterns of volatile components were found on increasing the pH of yeast wine from 3 to 6. Butan-2-ol was formed at pH 6; after fermentation the concn. of propan-1-ol was increased by 38.5% at pH 6.62% at pH 4.5, and 30% at pH 3.0. The effect of glucose and butane-2,3-diol on the production of volatile components was examined in a synthetic medium at pH 6.0. It was shown that propan-1-ol was formed exclusively from glucose, whereas ethyl acetate, butan-2-ol and other unknown substances were formed from butane-2,3-diol. The course of ethyl acetate formation from butane-2,3-diol is discussed. AS

17

[Strain of *Lactobacillus delbrueckii*-76 for fermenting sugar substrates for preparing sweet types of bread.]
Afanas'eva, O. V.; Kazanskaya, L. N.; Vasil'eva, A. I.; Pavlovskaya, E. N. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Khlebopekarnoi Promyshlennosti; **Union of Soviet Socialist Republics,** Leningradskoe Otdelenie Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Khlebopekarnoi Promyshlennosti)
USSR Patent 729 247 (1980) [Ru]

The Gram-positive bacillus consists of isolated cells, and is non-sporeforming. In the growing stage the yeast is cultured on sugar substrate (68% water) from rye flour with additions of malt and caraway at 50–52°C and pH 3.2–3.3. In the production stage the culture is mixed with 4× the vol. of sugar solution at the same temp. and pH for 8–9 h. W&Co

18

[Effect of mesophilic lactic acid bacteria on resistance of wheat bread to rope.]
Vitavskaya, A. V.; Ship, A. P.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 5, 29-31 (1980) [Ru] [Kazgipropishcheprom, USSR

The experimental material was grade II wheat flour with a natural contamination of 50 000 spores/g, or additionally contaminated flour up to a level of 250 00(spores/g. The rope spores were exposed to a lactobacillus starter (*L. fermenti*-27) with 24-25° acidity 70-72% moisture and ability to reduce an 0.01% solution of methylene blue in 20-30 min; the culture contained 3-4 × 10^9 lactobacilli/g. The thin sponge dough contained 4% starter and the finished bread was analysed immediately after baking and then at five 24-h intervals during storage in a thermostat at 37°C. pH, total titratable acidity, content of water soluble matter and catalase activity were determined. The lactic starter with *L. fermenti*-27 had a bacteriostatic effect on rope spores; mesophilic starters give 100% inhibition of their development. The spores remained inactive during the whole storage period. STI

19

[Effect of *Streptococcus thermophilus* on the organoleptic features of fermented skim milk produced by *Lactobacillus bulgaricus* culture.]
Suzuki, I.; Watanabe, M.; Kitada, T.; Kato, S.; Morichi, T.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 51 (5) 342-346 (1980) [9 ref. Ja, en] [Nat. Inst. of Anim. Ind., Kukisaki-mura, Ibaraki-ken 305, Japan]

Pasteurized skim milk (SNF 14%) with 5% added sucrose was cultured at 43°C with *L. bulgaricus* B 5b, B-6, YB-62 or Bd-1 at 2%, or with 1% *L. bulgaricus* + 1% *S. thermophilus* 510 with or without 0.2 mg formic acid/g. Mixed cultures of *L. bulgaricus* + *S. thermophilus* developed more acidity than *L. bulgaricus* alone (1.09-1.20 vs. 0.73-0.86%) and were more acceptable to a 10 man panel. Milk fermented with *L. bulgaricus* B-6 or B5b + formate or + *S. thermophilus* received significantly better scores for taste than cultures with *L. bulgaricus* or *S. thermophilus* alone. Adding *S. thermophilus* to the culture with *L. bulgaricus* B-6 also improved texture ($P < 0.05$). Very little acetaldehyde was produced when pasteurized skim milk (SNF 8%, heated for 20 min at 100°C) was cultured with *L. bulgaricus* B-6 or B5b, compared to a mixed culture or the addition of formate, or when skim milk autoclaved at 121°C for 15 min was cultured with *L. bulgaricus* alone. *L. bulgaricus* did not appear to stimulate the growth of *S. thermophilus*, nor did the addition of 100 mmol valine, glycine or histidine/100 ml pasteurized milk. BWH

20

The effect of pyruvate on the production of flavour compounds by *Lactobacillus casei* ATCC 7469.
Cardenas, I. L. B. de; Ruiz Holgado, A. P. de; Oliver, G.
Milchwissenschaft 35 (5) 296-300 (1980) [15 ref. En, de] [Inst. de Microbiol., Univ. Nacional de Tucuman, Ayacucho, Argentina]

The ability of 4 strains of lactobacilli (*L. casei* ATCC 7469, *L. fermentum* ATCC 9338, *L. brevis* ATCC 14869 and *L. acidophilus* CNRZ 232) to use sodium pyruvate as sole source of carbon was examined. Addition of 0.5% pyruvate to a medium containing 10 g yeast extract, 15 g peptone, 10 g tryptone and 1 ml Tween 80/l resulted in increased growth of *L. casei, L. acidophilus* and *L. brevis*, but not of *L. fermentum*. Higher concn. of pyruvate were inhibitory to all 4 strains. Induction of the pyruvate decarboxylase system in *L. casei* cells was studied by measuring acetoin and diacetyl production after incubation of the *L. casei* cells in media of different compositions. Results indicated that the biosynthesis of diacetyl from pyruvate was constitutive and that the synthesis of acetoin via α-acetolactate was induced by pyruvate. These findings suggest that addition of pyruvate to natural milk fermentations could be used to enhance flavour production. MEG

21

[Use of bifidobacteria in the manufacture of cultured products for children.]
Semenikhina, V. F.; Sundukova, M. B.
Molochnaya Promyshlennost' No. 3, 33-34 (1980) [Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Strains of bifidobacteria isolated from the faeces of breast-fed and artificially fed infants were examined for their physiological and biochemical properties and for their capacity to grown in sterile milk and produce a high level of acidity. The highest rate of growth was obtained in sterile milk supplemented with 0.25-1.0% maize extract and a solution of mineral salts, max. numbers being noted at 0.5-1.0% maize extract concn. (10^7/ml) corresponding to 1000-fold multiplication of the initial counts over 16 h of incubation. In the unsupplemented milk the growth was only 10-20 fold. The rate of acidity development was also highest in the substrate with maize extract, reaching 110-125°T after 16 h cultivation, vs. 45-48°T for the unsupplemented milk. A method for the preparation of a bifidobacterium starter for the production of infant foods was evolved and a method is being developed for the manufacture of bifidobacteria-containing products for infants. FL

22

Thermal shocking during manufacture develops flavor in Cheddar cheeses.
Thompson, M. P.
Dairy Field 163 (5) 74F-74G (1980) [En] [E. Reg. Res. Cent., USDA, Philadelphia, Pennsylvania, USA]

Heat-shock of *Streptococcus cremoris* ATCC 14365 by holding at 64°C for 15-16 s resulted in 99% kill of the organism, but survival of 72-87% of the activity of 3 peptidases [see FSTA (1980) 12 2P272]. Milk containing 10^7 colony-forming units *Str. cremoris*/ml was treated at 64°C for 16 s and used to manufacture low-fat Cheddar cheese. Properties of the experimental and control cheeses measured at various stages of ripening showed that pH was always lower in experimental than corresponding control samples although the total

bacterial count was not greater. The experimental cheeses showed a greater degree of protein hydrolysis (as amount of 5% TCA-soluble material measured at 280 nm), and a 58% increase in free fatty acids after 3 months of ripening vs. an increase of only 2.5% in the control cheeses. CDP

23

Isolation and ultrastructure of bacteriophages of group N (lactic) streptococci.
Lembke, J.; Krusch, U.; Lompe, A.; Teuber, M.
Zentralblatt für Bakteriologie, 1C 1 (1) 79–91 (1980) [17 ref. En] [Inst. Mikrobiol., Bundesanstalt für Milchforschung, 2300 Kiel, Federal Republic of Germany]

During a 2 yr screening period, approx. 200 bacteriophages active against lactic streptococci have been isolated in a cheese factory from raw milk, whey and starter cultures using an indicator set of 24 strains of *Streptococcus lactis*, 17 strains of *Str. cremoris* and 16 of *Str. lactis* subsp. *diacetylactis*. Electron microscopy of these phages suggests the existence of at least 14 distinct morphological types. The ultrastructure and host range of 14 typical phage types are described, including 5 for *Str. cremoris*, 4 for *Str. lactis* subsp. *diacetylactis* and 5 for *Str. lactis*. JMD

24

[Effect of temperature and water activity (a_w) on the growth of lactobacilli.]
Campanini, M.; Casolari, A.
Industria Conserve 55 (2) 103–108 (1980) [19 ref. It, en] [Sta. Sperimentale per l'Ind. delle Conserve Alimentari, Parma, Italy]

The effect of cell concn. and temp. on the growth of 4 lactobacillus strains (2 strains of *Lactobacillus casei, L. buchneri* and *L. cellobiosus*) was studied in media with 0, 6, 8 and 10% NaCl at a_w-values 0.925–0.983. Results, shown graphically and in tables, showed that the min. number of cells needed to initiate growth increased with decreasing a_w-value and temp. and decreased with increasing incubation time (up to 45 days). The min. a_w-value for growth varied with strain from 0.925 to 0.955 (corresponding to 10 and 6% NaCl resp.). The min. a_w-value for growth of the individual strains increased with decreasing incubation time and cell concn. AS

25

Alteration of host specificity to lytic bacteriophages in *Streptococcus cremoris*.
Sinha, R. P.
Applied and Environmental Microbiology 40 (2) 326–332 (1980) [27 ref. En] [Food Res. Inst., Canada Agric., Ottawa, Ontario, Canada K1A 0C6]

26

[Effect of tartaric acid on shelf life of delicatessen salads.] Einfluss von Weinsäure auf die Haltbarkeit von Feinkostsalaten.
Baumgart, J.; Hausschild, G.
Fleischwirtschaft 60 (5) 1052, 1055–1056 (1980) [5 ref. De, en] [Fachhochschule Lippe, Liebigstrasse 87, D-4920 Lemgo, Federal Republic of Germany]

The effect of a commercial additive (containing tartaric acid as active ingredient) on the shelf life of Waldorf salad containing no preservative and with 0.3–0.38% acetic acid was investigated. 42 samples containing 0.5% and 25 samples containing 1.0% of the product were inoculated with lactic acid bacteria and a yeast, and stored 24 days at 8°C. Results, shown graphically and in tables, revealed that the lactic acid bacteria *Pediococcus cerevisiae, Leuconostoc mesenteroides, Lactobacillus buchneri* and *L. plantarum* were inhibited by 0.5%, but spoilage by the yeast *Pichia membranaefaciens* could not be prevented even by the sensorily undesirable concn. of 1% of the additive. RM

27

[Medium for identification and determination of lactic acid bacteria in beer and intermediate products.]
Bendova, O.; Kurzova, V.; Savel, J.; Prokopova, M.
Czechoslovak Patent 196 473 (1980) [Cs]

The medium contains 10% beer (concn. 30–99%), 0.1–10% meat extract, 0.1–10% yeast autolysate, 0.1–10% glucose, 0.0001–0.1% $MgSO_4$, 0.0001–0.1% $MnSO_4$ and 0.01–10% polyethylene glycol sorbitate monooleate. STI

28

Bacterial production of lactic acid in sweet worts.
Healy, P.; Armitt, J.
Journal of the Institute of Brewing 86 (4) 169–170 (1980) [4 ref. En] [Res. Lab., Castlemaine Perkins Ltd., Brisbane, Australia]

Incubation of a commercial sweet wort (sp. gr. 1.030) at 62°C for 4.5 h resulted in production of 400 mg L-lactate/l. There was no increase in D-lactate, pH decreased from 5.42 to 4.13 and total cell count increased from 0.103×10^6 to 18.6×10^6 cells/ml. Organisms that grew in wort at 60–70°C that were responsible for L-lactic acid production had characteristics intermediate between *Bacillus coagulans* and *B. stearothermophilus*. Malt was found to contain lactic acid; contents of D- and L-lactic acid, resp., in 3 malt samples were 43.5 and 46.5, 22.3 and 11.2, and 33.0 and 15.5 mg/100 g malt. Laboratory worts brewed from commercial malts and incubated at 60–70°C also showed growth of thermophilic organisms, suggesting that commercial malts contain the microflora. DIH

29

Variations amongst beers and lactic acid bacteria relating to beer spoilage.
Dolezil, L.; Kirsop, B. H.
Journal of the Institute of Brewing 86 (3) 122–124 (1980) [En] [Brewing Res. Foundation, Lyttel Hall, Nutfield, Redhill, Surrey, UK]

Ability of lactic acid bacteria to grow in beer was studied using 31 beers, 13 strains of *Lactobacillus* and 3 strains of *Pediococcus* isolated from wort or beer. In 3 beers all the microorganisms were able to grow, in 5 beers none of them developed and diverse results were obtained with the remaining 23 beers. Resistance of the beers to spoilage was not correlated with values of pH, specific gravity, total or free amino N, individual or total fermentable sugars, colour or levels of SO_2.

Resistant beers became sensitive after certain filtration treatments and after heating at 80° for 15 minutes, but not after treatment at 60°. Resistance to spoilage is tentatively attributed to the presence of a yeast metabolite which is heat-labile. The lactic acid bacteria varied in their ability to grow in beer but those possessing a broad range of biochemical abilities had the greater propensity to cause spoilage. AS

30

Lactobacillus bavaricus sp. nov., a new species of the subgenus _Streptobacterium_.
Stetter, H.; Stetter, K. O.
Zentralblatt für Bakteriologie, 1C **1** (1) 70–74 (1980) [15 ref. En] [Bot. Inst., Univ. München, Menzinger Strasse 67, D-8000 Munich 19, Federal Republic of Germany]

A rod-shaped Gram-positive bacterium isolated from sauerkraut is described as a new species on the basis of physiological and biochemical features. This species is related to the *L. curvatus – L. sake* group but differs from these species by the formation of exclusively D(+)-lactic acid. It has been named *L. bavaricus* after the area of isolation of the first strains. AS

31

Production of high-fructose syrup by a heat-fixed _Lactobacillus_ sp.
Mamta Bhatia; Prabhu, K. A.
Biotechnology and Bioengineering **22** (9) 1957–1977 (1980) [31 ref. En] [Biochem Div., Nat. Sugar Inst., Kanpur-208017, India]

A *Lactobacillus* sp. isolated from soil and capable of growing on xylose-containing medium exhibited high glucose isomerase activity. The enzyme was thermostable, stable toward dialysis, and activated by heat treatment. It did not show the presence of xylose or ribose isomerase activities; the K_m for glucose and xylose substrates were 0.48M and 0.513M resp. Heat treatment of ultrasonic crude extract gave insoluble fixed active glucose isomerase enzyme. The properties of free and immobilized enzyme in heat-fixed whole cells differed in many respects. The optimum temp. for enzyme activity changed from 70 to 85°C, optimum substrate concn. changed from 1.0M to 2.4M, and optimum pH from 7.4 to 6.0. Co^{2+} and Mg^{2+} ions activated the enzyme when used singly, but in combination they inhibited the enzyme and Mn^{2+} had no effect. Free and immobilized enzymes, when used in the conversions of corn and bagasse hydrolysates to fructose, gave 58, 25.6%, and 50, 27.6% conversions, resp. Immobilized enzyme retained a significant activity for >30 h and was able to operate at higher glucose concn. showing less product inhibition effect than free enzyme. In the batch process it was able to operate for about 8 cycles. AS

32

[The microflora of sour dough. X. Effect on baking of lactic acid bacteria (genus _Lactobacillus_ Beijerinck) occurring in dough starter cultures (Reinzuchtsauer).] Die Mikroflora des Sauerteiges. X. Die backtechnische Wirkung der in 'Reinzuchtsauern' auftretenden Milchsäurebakterien (Genus *Lactobacillus* Beijerinck)
Spicher, G.; Schröder, R.; Stephan, H.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 171 (2) 119–124 (1980) [9 ref. De, en]

[Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Schützenberg 12, D-4930 Detmold 1, Federal Republic of Germany]

4 homofermentative and 6 heterofermentative spp. of lactobacilli isolated from sour doughs, were used to produce rye sour doughs under 3 process conditions and quality of resulting bread was evaluated from acidity, crumb elasticity and flavour. Bacterial cultures were enriched before use by growth in rye bran/extract broth. Doughs were made from 3-stage sour dough, Detmolder 1-stage sour dough or Berliner short sour dough. Results are tabulated for each dough process and are compared with those from a commercial starter culture and a spontaneous sour dough. In general homofermentative bacteria performed inadequately, giving weak bread flavour and insufficient acidification for good crumb elasticity, although acidification behaviour of *L. plantarum* and *L. farciminis* usually gave rise to crumb of satisfactory quality. Heterofermentative bacteria gave better flavour and acidification performance, and *L. brevis* var. *lindneri* performed almost as well as a standard starter culture in all 3 dough processes. *L. fructivorans* and *L. brevis* also performed well in all 3 processes; remaining cultures failed to produce satisfactory crumb elasticity or flavour in the Berliner short sour process. [See FSTA (1980) 12 10M1115 for part IX.] DIH

33

[Morphological, physiological and biochemical characteristics and methods of differentiation of _Lactobacillus bulgaricus_. A review.] Morfologichni, fiziologichni i biokhimichni svojstva i metody za diferentsirane na *L. bulgaricus*. [Book]
Obretenova, S.
49pp. (1979) [126 ref. Bg] Sofia, Bulgaria; Informatsiya i Propaganda – Natsionalen Agrarno-Promishlen Sayuz. Nauchno-Proizvodstven Kompleks po Mlechna Promishlenost [Inst. po Mlechna Promishlenost, Vidin, Bulgaria]

A review is presented on classification of lactobacilli. The following methods are described: serological, determination of chemical composition of cell walls, IR absorption spectra, and free amino acids and peptides in the cell. Differentiating characteristics of *L. bulgaricus* are given in detail and compared with those of other lactobacilli. STI

34

Effect of incubation temperature and heat treatments of milk from cow and buffalo on acid and flavor production by _Streptococcus thermophilus_ and _Lactobacillus bulgaricus_.
Jasjit Singh; Adarsh Khanna; Harish Chander
Journal of Food Protection 43 (5) 399–400 (1980) [13 ref. En] [Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal, Haryana 132001, India]

Cultures of *Str. thermophilus* alone and mixed with *L. bulgaricus* produced more acid and acetaldehyde at 37°C than at 42°C in both cows' and buffaloes' sterilized milk, whereas *L. bulgaricus* alone showed the reverse;

activities at either temp. Prior heat treatment of the milk (65°C for 30 min, 85°C for 10 min or steam for 30 min) affected activity of the cultures; the mixed *Str. thermophilus/L. bulgaricus* culture showed max. acid and acetaldehyde production in milk that had been steamed for 30 min. whilst volatile acidity and proteolytic activity were highest in milk that had been heated at 65°C for 30 min. Values of all 4 properties for *Str. thermophilus* culture were highest in milk that had been heated at 65°C for 30 min. CDP

35

Mechanistic model of the growth of *Streptococcus cremoris* HP at superoptimal temperatures.
Franks, P. A.; Hall, R. J.; Linklater, P. M.
Biotechnology and Bioengineering 22 (2) 1465–1487 (1980) [27 ref. En] [School of Chem. Eng., Univ. of NSW, Kensington, NSW 2033, Australia]

The proposed model is represented by 4 equations based on 3 biomass types (anabolically active, catabolically viable and total biomass) and takes into account both balanced and transient growth at superoptimal and supermaximal temp. (30–38°C). The model is used to explain the observed growth and acid production by *Str. cremoris* HP in Cheddar cheese manufacture as the temp. is increased from 30°C through the superoptimal temp. region (about 36°C) to the supermaximal region (38–40°C) at which all balanced growth ceases; the 4 main mechanisms involved are maintenance energy, endogenous metabolism, temp. uncoupling and death. The model is capable of predicting balanced growth and transient response of this starter organism to changes in growth temp., and may be used to take advantage of intermediate cooking temp. when using temp. as a fine control in Cheddar cheese fermentation. CDP

36

[Mesophilic lactic starters. A review.] [Review]
Cogan, T. M.
Lait 60 (597) 397–425 (1980) [77 ref. Fr, en] [Agric. Inst., Fermoy, Co. Cork, Irish Republic]

Several important aspects of mesophilic starter cultures are reviewed. Single-strain, multiple-strain and the different types of mixed-strain starters are discussed and simple tests to distinguish the different bacteria present in such cultures are given. The importance of nitrogen and lactose metabolism in growth of starter cultures in milk is treated briefly, as is the control of glycolysis. Citrate metabolism and production of diacetyl an acetoin are considered in some depth. Inhibition of starters by bacteriophage, the role of lysogeny as the major source of bacteriophage in the factory environment and the practical production of starters in the cheese factory are also considered. AS

37

Production of hydrogen peroxide by *Lactobacillus acidophilus.*
Collins, E. B.; Aramaki, K.
Journal of Dairy Science 63 (3) 353–357 (1980) [25 ref. En] [Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

The 4 strains of *L. acidophilus*, used in a previous study [see FSTA (1978) 10 12P2610], were grown in 10% reconstituted skim milk or in low-fat milk. 2 strains (A and B, isolated from commercial frozen conc. cultures used for preparing non-fermented acidophilus milks) produced <2 μg H_2O_2/ml in 24 h at 37°C with or without shaking; strains C and D (lyophilized cultures of *L. acidophilus*) produced 40–55 μg H_2O_2/ml in continuously shaken cultures. No H_2O_2 was found in commercial non-fermented acidophilus milk stored at 4°C with shaking. After inoculation of low-fat milk with strains B and D (3.0×10^8 organisms/ml) and storage at 4°C for 7 days with shaking, H_2O_2 production was 0.75 and 5.0 μg/ml for strains B and D resp. Growth of *Pseudomonas fragi* (3.5×10^2/ml) in low-fat milk was retarded by the presence of strains C or D (approx. 4.0×10^8/ml). Addition of FAD had no effect on oxidation of $NADH_2$ by cell-free extracts of strains A and B, whereas it increased oxidation of $NADH_2$ by cell-free extracts of strains C and D, indicating that $NADH_2$ oxidases of these strains produce H_2O_2 as an end product. Results indicate that an unrealistically large number of *L. acidophilus* would be required to accumulate enough H_2O_2 to extend the shelf life of acidophilus milk. MEG

38

Antibacterial activity of lactobacilli in fermented dairy products.
Jasjit Singh; Adarsh Khanna; Srinivasan, R. A.
Indian Dairyman 31 (12) 867–868 (1979) [En] [Div. of Dairy Microbiol., Nat. Dairy Res. Inst., Karnal, Haryana India]

This article discusses briefly the therapeutic role of lactobacilli in fermented dairy products such as dahi, yoghurt, kefir, koumiss and acidophilus milk. In India, about 60% of milk production is from buffaloes. The need for more information on fermented dairy products prepared from buffaloes' milk is mentioned. MEG

39

[Manufacture of Wishari-like cheese from cows' milk. I. Isolation and characterization of some microorganisms involved in cheese ripening and the study of their growth rates during cheese ripening.]
Abdul-Karim Salih Mahdi; Al-Shabibi, M. M. A.
Iraqi Journal of Agricultural Science **13,** 289–303 (1978, publ. 1980) [12 ref. Ar, en]

Streptococci, lactobacilli and the yeast *Debaryomyces* were isolated from Wishari cheeses purchased green from northern Iraq (Zakho Province), and were grown in sterilized skim milk (lactobacilli, streptococci) or nutrient agar (yeast) and used as starter cultures (1%) in the manufacture of Wishari-like cheese. Growth of streptococci was fastest during the 1st 20 days of ripening and then decreased; at this stage, growth of lactobacilli increased rapidly. The *Debaryomyces* grew slowly for the 1st 20–25 days and then diminished, being absent from the cheese after 50–55 days of ripening. [From En summ.] DMK

40

[Utilization of citric acid during storage of raw milk in relation to lactic acid fermentation.]
Murunova, G. V.; Klimovskii, I. I.
Molochnaya Promyshlennost' No. 5, 14–16, 47 (1980) [Ru][Vsesoyuznyi Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

Raw milk samples obtained during Nov./Dec. were kept at room temp. (20–22°C) and at 30°C and tested at 3-h intervals for the contents of citric and lactic acids for up to 90 h. Results are presented graphically and show that citric acid decreased with time, slowly at first, then rapidly during 20–50 h, after which there was a gradual slowing down for both temp. The decrease was much more rapid for samples held at the higher temp. Lactic acid formation started after a lag phase of about 5–10 h, was very rapid during the subsequent 10–40 h (depending on the temp.) and the final acidity reached was much higher for the higher holding temp., this being attributed to the acidifying action of lactobacilli. The average utilization of citrate was 3.3% for the lower and 19.8% for the higher storage temp. after 24 h and it is concluded that under present conditions of cheese manufacture, only small decreases occur in citrate content of milk prior to its processing into cheese. FL

41

O_2 sensitivity of lactic streptococci. [Lecture]
Grufferty, R.; Condon, S.
Irish Journal of Food Science and Technology 3 (1) 60–61 (1979) [En][Dep. of Dairy & Food Microbiol., Univ. Coll., Cork, Irish Republic]

O_2 incorporated during growth of *Streptococcus lactis* C10 in milk or broth inhibited growth and acid production; strong inhibition occurred with lactose or galactose but little with glucose as substrate. No significant correlation was found between superoxide dismutase levels and inhibition by O_2. [See FSTA (1981) 13 3A120.] CDP

42

A modified agar overlay method for the enumeration of bacteriophages for *Streptococcus cremoris* strains AM1 and AM2. [Lecture]
Mullan, W. M. A.
Irish Journal of Food Science and Technology 3 (1) 60 (1979) [En][Dep. of Dairy Tech., West of Scotland Agric. Coll., Ayrshire, UK]

Highest plating efficiency of phages attacking *Str. cremoris* AM1 and AM2 resulted when phage was adsorbed at 20°C onto *Str. cremoris* US3 cells using PLGYG as the plating medium and 25% strength Ringer's solution as diluent. [See FSTA (1981) 13 3A120.] CDP

43

Low temperature survival of some lactic acid bacteria in lactic beverages. (In *'Food microbiology and technology'* [see FSTA (1981) 13 3B17].) [Lecture]
Rossi, J.; Costamagna, L.
pp. 195–205 (1979) [12 ref. En, it][Istituto di Microbiol. Lattiero-Casearia dell'Univ. di Perugia, Perugia, Italy]

4 different types of milk (soymilk, ultrafiltered milk, milk partially delactosed by *Kluyveromyces fragilis* and cows' whole milk) were incubated at 37°C for 5 days in the presence of a 2% inoculum of *Bifidobacterium bifidum, Lactobacillus acidophilus* or *L. bulgaricus* + *Streptococcus thermophilus*. The fermented milks were then stored at 8–10°C for up to 150 days. Changes in chemical composition during storage are discussed. Survival of lactic acid bacteria in the milks depended on the type of milk used. There were consistently high counts of *L. acidophilus* and *B. bifidum* in milks during 150 days storage, showing that these bacteria have a natural tendency to resist acid conditions. MEG

44

[A protective medium for obtaining dried lactic acid bacteria.]
Tertyshnyi, V. N.; Krasnobryzhii, N. Ya.; Polotnyak, A. D. (Kievskii Zavod Bakterial'nykh Preparatov)
USSR Patent 724 113 (1980) [Ru]

A protective medium for producing dried lactic acid bacteria includes dried skim milk and a sodium salt. Increased viability and a longer shelf life of the product are obtained when the medium contains sugar-beet molasses, the sodium salt is sodium glutamate, and the proportions of these ingredients in the dry product are: dried skim milk 5–10%; sugar beet molasses 0.5–1%; sodium glutamate 0.005–0.1. W&Co

45

Isolation and characterization of inhibitors produced by *Streptococcus lactis* subspecies *diacetylactis*.
Goseco, M.-A. S. E.
Dissertation Abstracts International, B 40 (10) 4724–4725: Order no. 80-05884, 163pp. (1980) [En][Purdue Univ., West Lafayette, Indiana 47907, USA]

46

Preparation and microbiological evaluation of bactopeptone from shrimp waste.
Suryanarayana Rao, S. V.; Dwarakanath, C. T.; Saraswathi, C. R.
Journal of Food Science and Technology, India 17 (3) 133–136 (1980) [17 ref. En][Cent. Food Tech. Res. Inst., Mysore-570 013, India]

Preliminary study on the preparation of bactopeptone (for use in bacteriological media) from shrimp (*Penaeus indicus*) head waste by papain treatment and its microbiological evaluation by lactobacilli is presented along with the chemical characteristics of the product. The shrimp head hydrolysate contained 13% N, 29.85% α-amino N, 0.60% fat and 0.48% tryptophan. pH was lowered from 8.0 to neutral by adding phosphoric acid; this also reduced the Ca level. Indole production was more marked with shrimp waste peptone than with a commercial sample. The growth rate of *Leuconostoc mesenteroides* and *Streptococcus faecalis* over 24 h was comparable to those grown on oxoid peptone. CFTRI

47

[Microbial contaminants and stability of beer.]
Bendova, O.; Kurzova, V.
Kvasny Prumysl 26 (1) 3-5 (1980) [Cs, ru, en, de]
[Vyzkumny Ustav Pivovarsky a Sladarsky, Prague, Czechoslovakia]

Data from tests aimed at determining quantitative relationships between undesirable microbial contaminants and beer stability are presented. Yeasts, lactobacilli and pediococci isolated from beer were studied for their propagation in 10° and 12° beers. Similar tests were carried out with yeast strains kept in the collection of the Beer and Malt Research Institute in Prague. STI

48

[The table olive. VI. Characteristics and prospects of the 'Olivone' variety.]
Brighigna, A.; Cucurachi, A.; Vlahov, G.; Solinas, M.; Marsilio, V.; Pelagatti, O.; Angelis, M. de
Annali dell'Istituto Sperimentale per la Elaiotecnica
No. 6, 113-130 (1976) [5 ref. It, en, fr, es]

Studies similar to those described in earlier papers of this series [see FSTA (1978) 10 8]1108 for part V] were carried out on 'Olivone' var. olives grown in the Minervo Murge and adjacent districts of Puglia. The olives are considered fully suitable for preparation as table olives by the Sevigliano system of controlled lactic acid fermentation. SKK

49

[Determination of correlation between diacetyl and acetaldehyde in streptococcal starters using gas-liquid chromatography.]
Ibragimova, A. Z.; Yakovlev, D. A.; Gorshkova, E. I.
Molochnaya Promyshlennost' No. 2, 43-45 (1980)
[6 ref. Ru] [Vses. Nauchno-issled. Inst., Zhirov, USSR]

Contents of acetone, ethanol, diacetyl and acetaldehyde, and diacetyl:acetaldehyde ratios were determined by GLC using a single strain of *Streptococcus lactis* and of *Str. cremoris*, 2 strains of *Str. diacetilactis*, and 2 mixed starters comprised of the 3 spp. of streptococci. Total bacterial counts and titratable acidity were measured after culturing at 30°C in sterilized milk for 6, 12 and 24 h. It was found that strains active in acid formation produced more acetaldehyde than diacetyl, the opposite being the case with strains active in aroma formation. In the 2 mixed starters, the ratio of diacetyl to acetaldehyde ranged from 2:1 to 5:2. SKK

50

The fermentation of milk by lactic acid bacteria. (In *'Microbial technology'* [see FSTA (1981) 13 4B31].)
[Lecture]
Lawrence, R. B.; Thomas, T. D.
pp. 187-219 (1979) [76 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

This review-type paper discusses selection and phage-resistance of lactic acid bacteria used in the manufacture of fermented milk products, inhibition of spoilage bacteria and pathogens by starter cultures, and the therapeutic properties of fermented milk products. Ecology and classification of lactic acid bacteria, differentiation of strains, growth and metabolism in milk, and production of flavour compounds are also discussed. Genetic relationships in lactic acid bacteria, and lactic streptococcal phages are mentioned. In the final section, a brief outline of recent innovations in starter culture technology is given. MEG

51

[Growth of heat-resistant streptococci in cheese milk pasteurizers. I. Some observations in cheese factories.]
Hup, G.; Bangma, A.; Stadhouders, J.; Bouman, S.
Zuivelzicht 71 (46) 1014-1016 (1979) [3 ref. Nl, en]
[Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Faults observed in Gouda cheese from certain factories in the Netherlands in 1978 were found to be due to high counts of heat-resistant streptococci, giving a high CO_2 content and unpleasant flavour. These faults occurred when the pasteurizer had not been cleaned for a long time, but were not observed in batches of cheese made immediately after the pasteurizer was cleaned. In a pasteurizer with a regenerative effect of 89%, the count of heat-resistant streptococci in cheese milk increased within 7-8 h to about 1 million/ml, and during cheesemaking there was a further increase to a final count of 1000 million/g. In another pasteurizer, with a regenerative effect of 65%, counts of 1 million/ml in cheese milk were also obtained, but not until after 12 h continuous operation. In both pasteurizers the bacterial growth occurred only in the exit section of the regenerator. Factors affecting the growth of heat-resistant streptococci are discussed on the basis of comparative observations in 6 cheese factories with different types of pasteurizers, and it is suggested that streptococcal counts can be reduced by rinsing the pasteurizer for 2-3 min with water, then gradually adding NaOH (up to 1%), circulating the alkali solution for 10 min, and finally rinsing again for 3 min with water. In pasteurizers with a 65% regenerative effect, good results can also be achieved by recirculating the milk for 4-5 min via the buffer tank, so that the temp. in the exit section of the regenerator rises to 72-74°C and bacteria adhering to the wall are killed. ADL

52

[Growth of heat-resistant streptococci in cheese milk pasteurizers. I. Some observations in cheese factories.]
Hup, G.; Bangma, A.; Stadhouders, J.; Bouman, S.
Voedingsmiddelentechnologie 12 (20) 67-69 (1979)
[3 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See preceding abstr.

53

[Growth of heat-resistant streptococci in cheese milk pasteurizers. II. Trials with a model pasteurizer.]
Driessen, F. M.; Bouman, S.
Zuivelzicht 71 (48) 1062-1064 (1979) [2 ref. Nl, en]
[Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

A model pasteurizer was constructed consisting of 20 identical units of double-walled stainless-steel pipes. Milk (flowing through the inner pipe) was heated from 4° to 72°C in the first 10 units, then cooled to about 20°C in the last 10 units. The water used for heating and cooling flowed through the space between the inner and outer pipes. Experiments with this set-up revealed that the growth of heat-resistant streptococci in pasteurized cheese milk [see preceding abstr.] was due to growth of *Streptococcus thermophilus* strain B on the wall of the exit section of the regenerator, reaching concn. of $\leq 10^7/cm^2$ and contaminating the cheese milk with $\leq 10^6$ bacteria/ml. The rate of contamination of the pasteurizer depended on the counts of *Str. thermophilus* in the raw milk before pasteurization. In view of this, it is recommended that milk with high streptococcal counts should be pasteurized in short runs, with frequent intermediate cleaning. [See preceding abstr. for part I.] ADL

54

[Growth of heat-resistant streptococci in cheese milk pasteurizers. II. Trials with a model pasteurizer.]
Driessen, F. M.; Bouman, S.
Voedingsmiddelentechnologie **12** (22) 34–37 (1979) [2 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See preceding abstr.

55

[Growth of heat-resistant streptococci in cheese milk pasteurizers. III. The specific flora and its effect on cheese quality.]
Hup, G.; Stadhouders, J.
Zuivelzicht **71** (51/52) 1141–1143 (1979) [7 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

Properties were studied of heat-resistant streptococci which had grown in cheese milk pasteurizers and were subsequently isolated from the cheese milk and cheese. All 6 strains studied had the characteristics of *Streptococcus thermophilus*, with preferential fermentation of disaccharides. Unlike normal *Str. thermophilus* strains, however, they grew in presence of 3% NaCl. When deliberately added to Gouda cheese milk, the streptococci caused an unpleasant yeasty flavour and an open structure due to excessive CO_2, some of which was produced by the streptococci and some by the citric acid-fermenting BD starter. These defects were observed when 0.1% starter was used, but were less apparent when the amount of starter was increased to the normal level of 0.8% or when the BD starter was replaced by a B starter producing less CO_2. The following methods were found suitable for counting heat-resistant streptococci: (i) in raw or thermized milk: heating for 35 min at 63°C, plating out in Plate Count Agar + 5% skim milk, and incubating for 2 days at 45°C; (ii) in pasteurized milk: as above, but without preliminary heating; (iii) in cheese: plating out in TGV Agar [*Journal of Netherlands Milk & Dairy (1961)* 15 (2) 127–150] and incubating for 2 days at 45°C. [See preceding abstr. for part II.] ADL

56

[Growth of heat-resistant streptococci in cheese milk pasteurizers. III. Specific bacterial flora and its effect on the quality of cheese.]
Hup, G.; Stadhouders, J.
Voedingsmiddelentechnologie **12** (24) 29–32 (1979) [7 ref. Nl, en] [Nederlands Inst. voor Zuivelonderzoek, Ede, Netherlands]

See preceding abstr.

57

[Determination of the aerobic bacterial count of vacuum-packaged beef during cold storage.]
Kontrolle des aeroben Keimgehaltes vakuumverpackten Rindfleisches während der Kühllagerung.
Beyer, K.
Fleischerei 31 (9) 939–942 (1980) [De] [Inst. für Lebensmittelhygiene, Fleischhygiene & -Tech., Freie Univ. Berlin, D-1000 Berlin 33]

Studies were conducted on counts of aerobic bacteria in beef pieces vacuum-packaged in 10 kg batches and stored at 2°C for ≤5 wk. The results show bacterial counts of meat pieces from a single vacuum pack to differ by a factor of 10^2–10^3; bacterial counts of subsamples from single meat pieces differed to a much smaller extent, whereas counts differed considerably between vacuum packs. Total count changed little during the first wk of storage, increased by a factor of 10–100 during the next 2 wk, then remained approx. constant. Pseudomonadaceae comprised a large proportion of the microflora throughout storage; counts of lactobacilli increased rapidly during storage. Yeast count increased slowly to a max. after approx. 4 wk, then declined slightly. *Micrococcus* sp. count decreased gradually during storage. Total Enterobacteriaceae count increased during the first 3 wk of storage to reach a max of approx. 10^5/g, then remained approx. constant. Little qualitative change in the Enterobacteriaceae flora during storage was observed. No pathogenic Enterobacteriaceae were detected. The results are discussed in relation to the hygienic quality and shelf-life of vacuum-packaged beef. AJDW

58

[Natural fermentation in manufacture of lambic and gueuze beers.]
Oevelen, D. van
Voedingsmiddelentechnologie **13** (21) 12–17 (1980) [1 ref. Nl, en] [Lab. voor Ind. Microbiol. & Biochem., Katholieke Univ., Leuven, Belgium]

Manufacture of lambic and gueuze (spontaneously-fermented Belgian beers) is discussed, with reference to the microflora at various stages of fermentation, and changes in the pH, and ethanol and residual extract concn. Data are given for the pH, extract content, alcohol content, apparent and actual attenuation, and concn. of organic acids, higher alcohols, esters and free fatty acids in gueuze samples made by the traditional process or by blending of lambic with other beers. The

role of *Pediococcus cerevisiae* in slime formation during maturation of lambic is discussed. Factors incluencing ester composition of lambic and gueuze are considered. AJDW

59

[Rapid method for production of wheat dough using a concentrated lactic acid starter.]
Sozontova, T. M.; Lopatin, V. F.; Vasin, M. I.; Dudoladova, L. S.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 2, 19-20 (1980) [Ru] [Nauchno-proizvodstvennoe Ob"edinenie Khlebopekarnoi Promyshlennosti, USSR]

A new, rapid method for dough production using a conc. leaven of lactic acid bacteria and intense working, is described. The method is characterized by an intensification of colloidal, microbiological and biochemical processes taking place during fermentation and ripening of the dough. Experimental batches of standard and fatty bakery products were manufactured under plant-scale conditions, using 1st grade wheat flour; dough (temp. 32-34°C) was prepared by the 1-stage method, with a relatively high amount of leaven (0.5-1% more, as required by the formulation). Mixing proceeded for 30 s and ripening for 80-90 min. Dough production time was reduced from 7-8 h to 1-2 h, fewer vats were required, consumption of flour was reduced, and the physical and mechanical properties of dough improved. Sanitation during dough production was easier, and the overall quality of finished products was improved. STI

60

Multiple modification/restriction systems in lactic streptococci and their significance in defining a phage-typing system.
Boussemaer, J. P.; Schrauwen, P. P.; Sourrouille, J. L.; Guy, P.
Journal of Dairy Research 47 (3) 401-409 (1980) [30 ref. En] [Dep. Recherches & Application, L'Air Liquide, Sassenage, France]

Attempts were made to define unrelated strains of lactic streptococci from their reactions to different phages so that they could be used in a rotation as lyophilized direct vat starters. When each of 6 strains of lactic streptococci was grown with homologous phages of the other 5 strains, only 3 of the 30 reactions were completely negative, and 23 showed a significant reaction suggesting restriction. Most of these reactions could be explained on the basis of modification/restriction (M/R). A mathematical model was developed that identified 4 M/R systems and possibly a 5th at the limit of detection. Of the 3 negative reactions, restriction of 1 was beyond the limit of detection, and 1 was negative due to lysogeny or lack of adsorption but showed the predicted restriction value after modification on the host of the challenging phage; the 3rd could not be explained. CDP

61

Effect of ripening cream with selected lactic acid bacteria on the quality of ghee.
Joseph, A. M.; Appachar, S. R.
Journal of Dairy Research 47 (3) 411-415 (1980) [22 ref. En] [Dep. of Dairy Bacteriology, Nat. Dairy Res. Inst., Karnal-132001, India]

Cream (40% fat) was ripened by incubation for up to 72 h at 30°C with *Streptococcus lactis* C10 or *Str. diacetilactis* DRC1, or at 37°C with *Str. thermophilus* HST or *Lactobacillus bulgaricus* LBW. Titratable acidity of the 4 cream cultures resp. were 0.4, 0.46, 0.42 and 0.68% after 12 h, 0.52, 0.70, 0.65 and 1.10% after 48 h, and 0.67, 0.80, 0.74 and 1.25% after 72 h. Diacetyl production by *Str. lactis* and *Str. diacetilactis* was max. after 48 h (12 and 28 p.p.m. resp.) and by *Str. thermophilus* after 36 h (19 p.p.m.). Ghee made from cream that had been ripened with *Str. lactis* or *Str. diacetilactis* had the highest flavour score (8 on a 10-point scale) after storage for 0 and 90 days at 37°C, and scored 6 and 5 resp. after 270 days; that made from *Str. thermophilus*- or *L. bulgaricus*-ripened cream or from unripened cream resp. scored 7, 6 and 6 initially, 6, 5 and 6 after 90 days, then deteriorated rapidly as free fatty acid values increased to > 0.5% (expressed as oleic acid). CDP

62

[Strain of *Streptococcus lactis* 791_7 used as a starter for cheese having a reduced secondary ripening temperature.]
Belova, G. A.; Medvedeva, Z. P.; Balashova, T. N.; Bausheva, I. A. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti Nauchno-proizvodstvennogo Ob"edineniya 'Uglich')
USSR Patent 727 686 (1980) [Ru]

A strain of *Str. lactis* 791_7 used as a starter for cheese having a reduced secondary ripening temp., is stored in the Culture Collections of the Scientific Production Association 'Uglich' and the All-Union Scientific Research Institute for Genetics and Selection of Industrial Microorganisms, as TsMTsM V-1688. W&Co

63

[Method of preparing dried acidophilus cultures.]
Koroleva, N. S.; Bannikova, L. A.; Lagoda, I. V.; Prusakova, N. V.; Krylova, V. V.; Likhonosova, N. D.; Mikhailova, M. M.; Mirzoeva, V. Sh. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti; **Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Myasnoi Promyshlennosti)
USSR Patent 604 207 (1980) [Ru]

A *Lactobacillus acidophilus* culture is grown in nutrient medium containing citric acid. The cell suspension is cooled, mixed with a protective medium, frozen and dried. To improve the antibiotics activity of

the preparation and to permit its direct introduction into filling mixture for sausages, the nutrient medium includes dried skim milk, and the culture is incubated for 4–5 h to a curd acidity of 120–160°T; sodium acetate, maize extract, $MnSO_4$ and vitamin B_{12} are then added and incubation is continued to an acidity of 480–550°T, zymase being added at the end of the cultivation period. The protective medium and cell suspension are preferably mixed in a 1:10 ratio. W&Co

64

Appraisal of media and methods for assay of bacteriophages of lactic streptococci.
Keogh, B. P.
Applied and Environmental Microbiology 40 (4) 798–802 (1980) [21 ref. En] [Dairy Res. Lab., CSIRO, Highett, Victoria 3190, Australia]

To assess the relative merits of tryptone yeast extract agar, the same medium unbuffered, and medium M17 for the assay of 9 bacteriophages of lactic streptococci, comparative plaque counts were made with an overlay of 3 or 9 ml. 4 of the phages exhibited no significant difference in plating efficiency between media. The effect of overlay vol. varied from strain to strain and was different for different media. The 3-ml overlay created suboptimal atmospheric conditions for those strains which had a special requirement for CO_2. The use of a 9-ml overlay obviated the need to incubate plates under CO_2 and overcame the problems related to special calcium requirements when tryptone yeast extract agar was used. The organic buffer (disodium β-glucerophosphate) was inhibitory to *Streptococcus cremoris* ML1 and showed no advantage over the inorganic phosphate buffer (K_2HPO_4) for most other strains. AS

65

[Some characteristics of strains of *Streptococcus thermophilus* used in the manufacture of yoghurt, and a proposed method of classification.]
Bouillanne, C.; Desmazeaud, M. J.
Lait 60 (598) 458–473 (1980) [27 ref. Fr, en] [Lab. de Microbiol. Laitiere, INRA, 783350 Jouy-en-Josas, France]

30 strains of *Str. thermophilus* were examined for rate of acidification, production of acetaldehyde, viscosity of a culture in milk, and acid production at 4 and 12°C. Tabulated results indicate the wide variation in these properties of the strains. A multidimensional statistical method for classifying strains according to these characteristics (with the exception of viscosity measurements) is described. 55 strains of *Str. thermophilus* were also examined for enzyme activities using the API-ZYM micro method. With the exception of 2 strains, all the other 53 strains had high β-galactosidase and leucine aminopeptidase activities, low esterase, valine- and cystine aminopeptidase activities and no alkaline phosphatase or α-galactosidase activities. A scheme for classifying the strains according to their enzyme activities is also described. AS

66

[L(+)- and D(−)-lactic acid in yoghurt products.] Der Gehalt an L(+)- und D(−)-Milchsäure in Joghurtprodukten.
Kunath, P.; Kandler, O.
Milchwissenschaft 35 (8) 470–473 (1980) [21 ref. De, en] [Bot. Inst. der Univ. München, Munich, Federal Republic of Germany]

2% yoghurt culture (1:1 *Streptococcus thermophilus* and *Lactobacillus bulgaricus*) was incubated for 3 h at 42°C until it coagulated; during this period the % lactic acid that was in the L(+) form decreased from approx. 95% at 1 h to 75% at 3 h. Further incubation at 4, 22 and 42°C resulted in an increase in the proportion of D(−) lactic acid, especially at 42°C, and after 24 h the proportion of lactic acid that was in the L(+) form had decreased to approx. 70, 58 and 40% at 4, 22 and 42°C, resp. With repeated subculture, the proportion of L(+) lactic acid present at coagulation gradually decreased, and after 5 transfers it constituted <60% of the total lactic acid. Although a high proportion of L(+) lactic acid in yoghurt products was common, it was not possible to guarantee a content of >70% L(+) lactic acid in products containing both streptococci and lactobacilli. CDP

67

[Plasmids in starter bacteria – occurrence and significance.] [Review]
Refstrup, E.; Vogensen, F. K.
Maelkeritidende 93 (22) 612–615 (1980) [12 ref. Da] [Maelkerilab., Den Kgl. Veterinaer- og Landbohojskole, Copenhagen, Denmark]

This review explains the nature of plasmids and discusses the significance of plasmid-coded enzyme systems in lactic acid bacteria for the future development of dairy starters. It appears that plasmids play a fundamental role in both the enzyme systems which are of greatest importance for dairy technology: the proteinase system, and the lactose utilization system. It may be possible in the future to achieve faster growth of starters by altering the system controlling plasmid replication. In the long term it may even be possible, by molecular cloning, to produce starters with special properties taken from other types of bacteria. ADL

68

Effect of the addition of extracts of thermophilic lactobacilli on acid production by *Streptococcus thermophilus* in milk.
Hemme, D. H.; Schmal, V.; Auclair, J. E.
Journal of Dairy Research 48 (1) 139–148 (1981) [29 ref. En] [INRA, Jouy-en-Josas 78350, France]

Soluble extract of 20 strains of thermophilic lactobacilli *(Lactobacillus helveticus, L. lactis* and *L. bulgaricus)* were prepared and added to milk for the culture of 10 strains of *Str. thermophilus.* Acid production was stimulated in 64.5% of cases for 9 of

these 10 strains. The *L. helveticus* extract were the most stimulatory, but the same extracts did not always strongly stimulate each strain of *Str. thermophilus*. The stimulatory effects observed varied with the vol. of extract and the strain of *Str. thermophilus*. *Str. thermophilus* 385 [isolated from a Japanese yoghurt] was not stimulated by any of the lactobacillus extracts. The stimulatory effects of the lactobacillus extracts were thought to be due to aminopeptidases rather than to a general caseinolytic activity. The possible addition of such extracts to milk used in the manufacture of cooked hard cheese is discussed. AS

69

[Formation and action of bacteriocins in milk.]
Bildung und Wirkung von Bacteriocinen in Milch.
Geis, A.; Singh, J.; Teuber, M.
***Kieler Milchwirtschaftliche Forschungsberichte* 32** (2) 143-150 (1980) [3 ref. De, en, fr] [Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

Of a total of 25 strains of *Streptococcus lactis*, *Str. lactis* subsp. *diacetylactis*, *Str. cremoris* (SC), and *Str. faecalis* subsp. *liquefaciens* (SL), isolated from milk products or starters, 2 strains of SC and 1 of SL produced bacteriocins in milk. Inhibition of an indicator *Str. lactis* strain was very marked with SC, but restricted with SL. The inhibitors had no effect on the producing strain, and did not sediment after centrifugation at 200 000 × g_n for several h. Effect of bacteriocin-forming strains on stability of starters is discussed. SKK

70

[Quality of bacterial cultures and conditions of activity preservation.]
Miljkovic, V.; Baltic, M.; Katic, V.
Mljekarstvo 30 (7) 207-212 (1980) [12 ref. Sh, en] [Vet. Fak., Belgrade, Yugoslavia]

Cultures of *Staphylococcus aureus*, *Escherichia coli* and *Proteus vulgaris* were suspended in skim milk or cultured cream, frozen at −27°C, held frozen for 10 days and defrosted. % survival on selective media of 1.0-1.4 × 10^6/ml inocula was resp. in milk 92.4, 14.4 and 39.8; and in cream, 6.6, 1.9 and 3.6. Cells of 2 strains of *Lactobacillus acidophilus* grown in MRS broth were frozen at −196°C, and defrosted after 10 days. % survival was 92.5 and 100 resp.; and loss of activity, measured by difference in acidification before and after freezing, was 1.3 and 0.75% resp. Further tests with freezing at −15° and −27°C confirmed earlier findings that freezing at −196°C was best. They showed also that slow defrosting at 4°C was more damaging than defrosting at 37°C. SKK

71

Restriction and modification in group N streptococci: effect of heat on development of modified lytic bacteriophage.
Sanders, M. E.; Klaenhammer, T. R.
Applied and Environmental Microbiology 40 (3) 500-506 (1980) [34 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

The appearance of lytic bacteriophage against newly introduced starter strains used during commercial cheese manufacture occurs rapidly, and their origin is not well understood. In this study, members of the group N streptococci were examined for the presence of bacteriophage restriction and modification systems. 2 streptococcal phages from *Streptococcus cremoris* TR and *Streptococcus lactis* C2 (phage designations tr and c2) showed restricted lytic development on *S. cremoris* 799 and KH, resp. Efficiency of plaquing was 1.9 × 10^{-7} for tr plaqued on 799 and 2.1 × 10^{-7} for c2 plaqued on KH. After passage through the restrictive hosts, these phages demonstrated high lytic ability for formerly restrictive hosts. Stress of the restrictive host strains at temp. of 40-50°C resulted in a significant increase in the efficiency of plaquing of restricted bacteriophages. Elevated temp. are encountered during commercial cheese manufacture. The results suggested that the temporary loss of host restriction activity with the resulting modification of nonspecific bacteriophage may contribute directly to the appearance of lytic phage against new starter strains. AS

72

[Response of a single-strain culture to varying phage contamination.] Reaktion einer Einstammkultur auf variierende Phagenkontamination.
Spillmann, H.; Puhan, Z.; Banhegyi, M.
Deutsche Molkerei-Zeitung 101 (17) 542, 544-545, 548, 551-552, 554-555 (1980) [11 ref. De] [Inst. für Lebensmittelwissenschaft, Eidg. Tech. Hochschule, Zürich, Switzerland]

This article contains essentially the same information on effects on a *Streptococcus cremoris* culture of contamination with the homologous phage at different phage: *Str. cremoris* ratios as presented in FSTA (1980) 12 5P998. Progressive destruction during 1-h incubation of *Str. cremoris* S10 with the homologous P10 phage is photographically illustrated. SKK

73

Bacteriophage propagation in chemostat cultures of *Streptococcus lactis*.
Archibald, A. R.; Ellwood, D. C.; Thomas, T. D.
FEMS Microbiology Letters 3 (6) 339-341 (1978) [8 ref. En] [Microbiol. Chem. Res. Lab., Univ. of Newcastle upon Tyne, Newcastle upon Tyne NE1 7RU, UK]

74

[Thermophilic lactic starters: properties and behaviour in dairy technology. A review.] [Review]
Accolas, J. P.; Hemme, D.; Desmazeaud, M. J.; Vassal, Bouillanne, C.; Veaux, M.
Lait 60 (598) 487-524 (1980) [103 ref. Fr, en, de] [Lab. Microbiol. Laitiere, INRA, 78350 Jouy-en-Josas, Fran

The first part of this review describes the role of thermophilic lactic starters in the manufacture of yoghurt and cheese. The taxonomy of *Streptococcus thermophilus*, *Lactobacillus bulgaricus*, *L. lactis* and

helveticus. the composition of starters and the use of frozen and freeze-dried concentrated starters are also discussed. The effects of thermophilic starters on the quality of yoghurt and ripening of hard cheeses are described. In the final section, studies on phages of thermophilic lactic acid bacteria are summarized. MEG

75

[Lactic streptococci. Demands on dairy practice, the manufacturer of starters, and research.]
Milchsäurestreptokokken - Eine Herausforderung für die milchwirtschaftliche Praxis, die Kulturenhersteller und die Wissenschaft.
Teuber, M.
Deutsche Molkerei-Zeitung 101 (18) 612, 614-616, 618 (1980) [8 ref. De] [Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

In this article, the help which research can offer to the dairy practice and the manufacturer of starters in developing and improving the use of streptococcal cultures is considered. The biological and biochemical bases of technologically important properties of lactic streptococci are discussed under the headings of evolution, lactic acid fermentation and lactose, aroma formation from citric acid, ripening of cultured milk products by lactic streptococci, selection advantages of lactic streptococci in milk against saprophytic microorganisms, and disturbances of acidifying activity of lactic streptococci by bacteriophage contamination. A final section deals with progress in manufacture of starter cultures. SKK

76

[Possibility of production of a cultured milk product from skim milk using a butter starter.]
Dordevic, J.; Misic, D.; Petrovic, D.; Jakica, M.
Mljekarstvo 30 (6) 163-168 (1980) [7 ref. Sh, en] [Poljoprivredni Fak., Zemun, Yugoslavia]

Samples of skim milk (8.5% DM and 0.1% fat) mixed with 5, 10 or 15% evaporated skim milk (20.1% DM and 0.55% fat) heated for 10 min at 95°C and cooled were incubated with 4% of a *Streptococcus lactis, Str. cremoris, Str. diacetilactis* (1:1:1) butter starter at 22° or 30°C for resp. 13 and 8 h, cooled to 4°C, stirred gently 12 h later and held at 4°C for a total of 48 h. Compositions of initial samples; contents of DM, fat and lactose, and titratable acidity, sp. gr. and viscosity of the finished variants; as well as development of acidity during incubation are tabulated. Final acidities ranged from 97° to 112°T. Best overall results including taste, aroma and consistency were obtained with products containing 15% added evaporated skim milk and incubated at 30°C; the 10% evaporated milk variants were also satisfactory. Cultured butter milk is not produced commercially in Yugoslavia, and this work investigated the possibility of producing a cultured skim milk beverage which could be acceptable to industrial manufacture. SKK

77

Cheese manufacturing by intensified lactic fermentation in milk and melting of the curd.
Dilanian, Z. Ch. [Dilanyan, Z. Kh.]
Milchwissenschaft 35 (10) 614, 616 (1980) [6 ref. En, de] [Zoovet. Inst., Erevan, USSR]

After preliminary tests to establish optimum manufacturing conditions, the following procedure was followed: skim milk, pasteurized at 72-75°C for 15 s and cooled to 32-34°C, was inoculated with 3-4% of a *Streptococcus diacetilactis/Str. thermophilus/Lactobacillus casei* starter and fermented to 40-42°T acidity; 20-30 g $CaCl_2$ + 2 g rennet/100 kg milk were then added, and the mixture agitated until an elastic curd was obtained (160-180°T and 35-40°T acidity in curd and whey resp.). The curd was dried on a frame for 10 min, crushed and then melted with 2.5% NaCl and sufficient cream to give a cheese of the required fat content. Cheese with 30% fat had amino acid contents of 70.93, 80.89 and 86.08 mg/100 g cheese SNF at 1, 5 and 10 days resp., the main amino acids being glutamic acid, valine and alanine. Acetic acid accounted for 96.6, 88.8 and 87.5% of volatile fatty acid content at 1, 5 and 10 days resp., with only small amounts of formic, propionic and butyric acids being formed. CDP

78

Characteristics of some lactic acid bacteria used as starter cultures in dry sausage production.
Nordal, J.; Slinde, E.
Applied and Environmental Microbiology 40 (3) 472-475 (1980) [19 ref. En] [Norwegian Food Res. Inst., N-1432 As-NLH, Norway]

The fermentation characteristics of 2 commercial (Duploferment 66 and Saga II) and 5 Norwegian lactic acid bacteria used in dry sausage production were compared with those of *Lactobacillus plantarum* ATCC 8014. The Norwegian strains lacked the ability to ferment mannitol, sorbitol, lactose, and D-(+)-raffinose and grew at 8 but not at 42°C, in contrast to the ATCC culture and the 2 commercial strains. The lactate dehydrogenase activity of the Norwegian strains was not stimulated by pyruvate. All strains were capable of peroxide destruction when grown in the presence of myoglobin. AS

79

Influence of certain processing steps on attachment of microorganisms to pork skin.
Butler, J. L.; Vanderzant, C.; Carpenter, Z. L.; Smith, G. C.; Lewis, R. E.; Dutson, T. R.
Journal of Food Protection 43 (9) 699-705 (1980) [13 ref. En] [Dep. of Anim. Sci., Texas Agric. Exp. Sta., Texas A&M Univ., College Station, Texas 77843, USA]

Pseudomonas putrefaciens and lactobacillus counts of inoculated pork skin obtained with the maceration method were usually higher than were those obtained with the rinse method. Scalding and dehairing and shaving caused extensive destruction of the test

organisms when placed on the skin before these slaughter-dressing steps. Smaller decreases in count occurred during singeing and washing and during evisceration and washing. Increases in S value (log count by maceration method minus log count by rinse method) for *P. putrefaciens* and a *Lactobacillus* sp. after freezing-thawing of inoculated pork skin may be related to a higher death rate of bacteria in the water film than for those entrapped in skin crevices. *P. putrefaciens* and the *Lactobacillus* sp. that were attached to pork skin exhibited greater heat resistance than did those bacteria which were not attached to skin. During storage of inoculated pork skin, S values of *P. putrefaciens* and the *Lactobacillus* sp. increased; this increase probably reflects increased strength of attachment of bacteria to the skin. Scanning electron microscopy of inoculated pork skin showed the formation of extracellular structures which may play a role in attachment of bacteria to skin or meat surfaces. AS

80

Bacteriology of electrically stimulated and unstimulated rabbit, pork, lamb and beef carcasses.
Mrigadat, B.; Smith, G. C.; Dutson, T. R.; Hall, L. C.; Hanna, M. O.; Vanderzant, C.
Journal of Food Protection 43 (9) 686–693, 705 (1980) [16 ref. En][Dep. of Anim. Sci., Texas Agric. Exp. Sta., Texas A&M Univ., College Station, Texas 77843, USA]

Electrical stimulation of rabbit muscles caused a reduction in count of *Pseudomonas putrefaciens* and of a *Lactobacillus* sp. when inoculated muscles were held for 45 min after electrical stimulation. Little if any change in count was detected on rabbit muscles immediately after electrical stimulation (ES) and after 20 min of storage. ES of pork carcasses did not affect the aerobic plate count (APC) of the skin surface. APC of cutaneous trunci from electrically stimulated sides of beef and lamb carcasses were similar to those of muscles from unstimulated sides or carcasses. APC of ground beef and blade steaks fabricated pre-rigor from electrically stimulated sides were often numerically lower after 3 days of storage than those of corresponding samples from unstimulated sides. Differences in APC between conventional and ES samples of ground beef prepared from vacuum packaged top round were significant ($P < 0.05$) after 6 days of storage. However, none of the other differences in count were statistically significant ($P < 0.05$). Electrical stimulation did not cause any consistent substantial changes in microbial types of ground beef, blade steaks, T-bone steaks or rib steaks. When minced, aseptically excised supraspinatus muscle was inoculated with either *P. putrefaciens* or a *Lactobacillus* sp., counts of these spp. in tissues from electrically stimulated beef often were significantly lower than those of corresponding unstimulated samples. AS

81

Studies on the growth of micrococci and lactobacilli with reference to their survivability upon freeze drying. [Lecture]
Yankov, Ya.; Brankova, R.
Proceedings of the European Meeting of Meat Research Workers No. 25, 7.12:629–7.12:634 (1979) [12 ref. En, de, fr, ru][Meat Tech. Res. Inst., Sofia, Bulgaria]

The desirable stage of growth of cultures of *Micrococcus* strain M_{95} and *Lactobacillus* strain L_4 for freeze-drying to yield starter preparations for use in meat products was studied, with special reference to survival during the freeze-drying operation. It was concluded that the optimum results were achieved with cultures at the end of the exponential phase/early stationary phase. If the cultures were freeze-dried in a protective medium based on skim milk, 100% survival could be achieved. [See FSTA (1981) 13 5S668.] STI

82

An evaluation of media for the cultivation or selective enumeration of lactic acid bacteria from vacuum-packaged beef.
Baird, K. J.; Patterson, J. T.
Record of Agricultural Research 28, 55–61 (1980) [26 ref. En][Queen's Univ. of Belfast, Newforge Lane, Belfast BT9 5PX, UK]

Comparative studies were conducted on the relative merits of 3 non-selective media, 3 elective media and 5 selective media for recovery of catalase negative bacteria (presumptive lactic acid bacteria) from vacuum-packaged beef. The trials were conducted on samples of bovine *longissimus dorsi* muscle vacuum-packaged and stored for 5 wk at 1 ± 1°C. Data are given for the total colony counts recorded from beef dilutions plated on the various media, and also for the ability of strains of various lactic acid bacteria and other bacteria to grow on the media. Of the non-selective and elective media, APT agar (all-purpose agar containing Tween) and Brain Heart Infusion Yeast Extract agar gave the best results, although both allowed growth of catalase-positive organisms. Of the selective agars, Nitrite Acidione Polymixin agar and de Man Rogosa & Sharpe agar gave the best selectivity for lactic acid bacteria; however, selective media probably would not recover all the lactic acid bacteria present. Incubation under reduced O_2 concn./increased CO_2 concn. conditions enhanced growth of many of the lactic cultures, and did not adversely affect growth of non-lactic organisms. AJDW

83

Antagonism between osmophilic lactic acid bacteria and yeasts in brine fermentation of soy sauce.
Noda, F.; Hayashi, K.; Mizunuma, T.
Applied and Environmental Microbiology 40 (3) 452–457 (1980) [27 ref. En][Cent. Res. Lab., Kikkoman Shoyu Co. Ltd., Chiba-ken, 278, Japan]

Brine fermentation by osmophilic lactic acid bacteria and yeasts for long periods of time is essential to produce a good quality of shoyu (Japanese fermented soy sauce). It is well known that lactic acid fermentation by osmophilic lactic acid bacteria results in the depression of alcoholic fermentation by osmophilic yeasts, but the nature of the interaction between osmophilic lactic acid bacteria and yeasts in brine fermentation of shoyu has not been revealed. The inhibitory effect of osmophilic lactic acid bacteria on the growth of osmophilic yeasts was investigated. It was recognized that osmophilic shoyu yeasts such as *Saccharomyces rouxii* and *Torulopsis versatilis* were inhibited by a metabolite produced by osmophilic lactic acid bacteria *(Pediococcus halophilus)* in brine fermentation of shoyu. The primary inhibitor was considered to be acetic acid, although lactic acid was slightly inhibitory. AS

84

Foodstuffs from rice by the action of bifidobacteria.
Mutai, M.; Mada, M.; Shimada, K. (KK Yakult)
UK Patent Application 2 043 101A (1980) [En]

An object is to provide a method for producing foods and drinks containing bifidobacteria. In 1 example, 15 kg whole glutinous rice were added to 70 l water, the mixture was heated at 121°C for 15 min and emulsified. Then 1 kg lactose and 10 l cows' milk were added, the volume made up to 100 l with water and the mixture was sterilized, incubated at 37°C with a *Bifidobacterium adolescentis* culture, homogenized, and sugar syrup (40 l with 4.8 kg sucrose) was added to obtain a drink containing 4.3^8/ml bifidobacteria. The product may also be made with dried skim milk, and spray-dried. FL

85

[Studies on the lactic acid bacteria isolated from ragi, bubod and luck pang.]
Toyoda, T.; Kozaki, M.
Journal of Agricultural Science [Tokyo Nogyo Daigaku Nogatu Shuho] Suppl. 3, 16–21 (1979) [4 ref. Ja, en] [Lab. of Applied Microbiol., Dep. of Agric. Chem., Tokyo Univ. of Agric., Tokyo, Japan]

12 strains of mould, 59 strains of yeast and 490 strains of lactic acid bacteria were isolated from ragi, bubod and luck pang [alcoholic rice beverages]. Morphological and biochemical studies were carried out on strains of tetrad-forming cocci. [From En summ.] JRR

86

[Classification of lactobacilli and pediococci detrimental to beer.]
Bendova, O.; Kurzova, V.
Kvasny Prumysl 26 (9) 197–199 (1980) [35 ref. Cs, ru, en, de] [Vyzkumny Ustav Pivovarnicky a Sladarsky, Prague, Czechoslovakia]

Changes which have taken place in the classification of pediococci and lactobacilli, Gram-positive microorganisms found in beer, during the last yr are tabulated and discussed. Further changes are expected in view of new research that has been carried out on these organisms. STI

87

[Strain of *Streptococcus diacetilactis* L_1 suitable as a starter for margarine.]
Ibragimova, A. Z.; Yakovlev, D. A.; Mikhailova, I. V.; Shamraeva, N. D.; Lovtsova, L. B.; Avdonina, K. P.; Ilyushina, K. I. (**Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Zhirov)
USSR Patent 767 202 (1980) [Ru]

Morphological characteristics are given for a strain of *Streptococcus diacetilactis* L_1 which can be used as a starter for margarine. W&Co

88

Stimulation of lactic starter cultures by filtration [filtrates] from milk cultures of some proteolytic spore-formers. II. *B. cereus* culture filtrates.
Magdoub, M. N. I.; Shehata, A. E.; Fayed, E. O.; Hofi, A. A.
Milchwissenschaft 35 (8) 474–476 (1980) [9 ref. En, de] [Food Sci. Dep., Ain Shams Univ., Shoubra El-Khaima, Cairo, Egypt]

Bacteria-free filtrates of cultures of *Bacillus cereus* NRRL B-4288 (grown in skim milk) had a stimulatory effect on growth of *Streptococcus lactis* in a skim milk medium. Filtrates from a 6-day culture were more stimulatory than those from 3-, 9- and 12-day cultures. Boiling the filtrates for 5 min before addition to the skim milk medium reduced the growth stimulation effect on *Str. lactis.* Acid production by *Str. lactis* was also increased by addition of unheated and to a lesser extent by addition of boiled filtrate, although the proteolytic activity of the filtrate was completely destroyed by boiling. Mention is made of the possible use of cell-free filtrates of cultures of *B. cereus* to overcome problems of low acid production by lactic starters. [See FSTA (1980) 12 7P1281 for part I.] MEG

89

Inhibitory action of *Lactobacillus bulgaricus* toward psychrotrophic bacteria from raw milk.
Gilliland, S. E.; Martin, D. R.
Miscellaneous Publication, Oklahoma Agricultural Experiment Station No. 107, 45–49 (1980) [7 ref. En]

Selected lactobacilli were isolated from samples of commercial yoghurt, and frozen conc. cultures prepared from 6 strains of *L. bulgaricus* with varying ability to produce H_2O_2 in milk. After 1 month, known amounts of reconstituted cultures were mixed with a Gram-negative psychrotroph (isolated from raw milk) in a medium containing skim milk, and stored for 6 days at 5.5°C. Growth of the psychrotroph was not significantly affected by up to 1×10^7 lactobacilli/ml, but at 2.5×10^7 lactobacilli/ml there was significant inhibition ($P < 0.05$) which increased as numbers of lactobacilli increased. In comparisons of average % inhibition by the different *L. bulgaricus* strains (all at 2.5×10^7 cells/ml) the strains showing stronger % inhibition produced more H_2O_2 in skim milk than the less inhibitory strains. JMa

90

[Configuration of Bulgarian yoghurt.]
Aleksieva, P.; Girginova, T.; Kondratenko, M.
Khranitelna Promishlenost 29 (5) 22–24 (1980) [5 ref. Bg]

Cows' whole milk was pasteurized for 30 min at 92–95°C and then made into yoghurt by incubation at 45°C with 2% of 5–12 culture. The ratio of *Lactobacillus bulgaricus* to *Streptococcus thermophilus* was 1:3 after coagulation. The ratio of L(+) to D(−) lactic acid was 1.15:1 after 3 h at 45°C, 0.57:1 after 6 h, and 0.38:1 after 24–27 h. In a 2nd experiment, where the *L. bulgaricus/Str. thermophilus* ratio was 1:10, the L(+):D(−) ratio decreased from 6.24:1 after 2 h to 2.84:1 after 3.5 h. In a 3rd experiment, with 1:1 *L. bulgaricus/Str. thermophilus*, the L(+):D(−) ratio dropped from 4.51:1 after 2 h to 1.71:1 after 3.5 h. From these results it is concluded that Bulgarian yoghurt can be used for infant feeding without risk of acidosis due to predominance of L(+) lactic acid. Further investigations revealed that the L(+):D(−) ratio in yoghurt made at the Serdika dairy, Sofia, on various dates from 29 Aug. to 24 Oct. 1979, ranged from 0.5:1 to 1.22:1. It tended to be higher than 1:1 when the *L. bulgaricus/Str. thermophilus* ratio (which ranged from 1:0.1 to 1:13) was 1:≥1. The L(+) form of lactic acid dominated in samples with 105–115°T acidity, but the D(−) isomer was sometimes dominant in samples with higher acidity. ADL

91

[New cultured milk product for infant feeding.]
Kochkova, Z.; Spasov, S.
Khranitelna Promishlenost 28 (6) 10–12 (1979) [Bg, ru, de, en]

A new infant feeding product has been developed in Bulgaria by culturing the humanized milks Humana and Bebe-1 with selected pure cultures of *Lactobacillus bulgaricus* (in particular, strain No. 144) which survive in the intestine. The new product was fed 6 times/day to 44 infants aged 1–4 months. It was well accepted, without digestive disorders. Absorption and retention of N and fat were excellent, and the infants showed better wt. gains than infants on non-cultured humanized milks. Microbiological investigation of intestinal contents showed that the *L. bulgaricus* had antagonistic effects on potential pathogens such as *Staphylococcus aureus, Klebsiella, Enterobacter* and *Proteus* spp. ADL

92

[Use of polyvalent cultures in ripening of cheese in plastics film.]
Sutic, M.; Vilusic, S.; Obradovic, D.; Davitkov, A.; Markovic, D.
Mljekarstvo 30 (5) 133–143 (1980) [16 ref. Sh, en] [Poljoprivredni Fak., Zemun, Yugoslavia]

Trappist cheese was made in the PKB dairy factory using (i) the customary *Streptococcus lactis, Str. cremoris, Str. citrovorus, [Leuconostoc cremoris]* starter, or (ii) a polyvalent starter of *Str. lactis* AK-60 and *Micrococcus* M-104 in 1:1 proportion. Half of (i) and (ii) cheeses was ripened customarily, and the other half was ripened packaged in plastics film. Counts of total bacteria, streptococci, lactobacilli and micrococci during 34 days of ripening are graphically presented; contents of DM, fat, total and soluble N, and NaCl, and pH values are tabulated for (i) and (ii) cheeses before and at different stages of ripening, and values for organoleptic assessment (taste, aroma, appearance, consistency) of ripe cheeses are presented. Overall, the ripening period was shorter and organoleptic quality higher in (ii) than in (i) cheeses; and, in both (i) and (ii) cheeses, film ripening had a beneficial effect. SKK

93

[Characteristics of *Pediococcus* strains isolated from Kachkaval cheese.]
Andric, M.; Sutic, M.
Mljekarstvo 30 (4) 99–106 (1980) [19 ref. Sh, en] [Poljoprivredni Fak., Zemun, Yugoslavia]

11 strains of *Pediococcus* isolated from 3 samples of ewes' milk Kachkaval cheese were identified using selective media and cultural characteristics as *P. cerevisiae* and *P. acidilactici*. In tests with 18 strains of lactobacilli and 8 of lactic streptococci, the pediococci strains showed no antagonisms in most (90%) cases. SKK

94

Psychrotrophic *Lactobacillus plantarum* from fish and its ability to produce antibiotic substances. (In *'Advances in fish science and technology'* [see FSTA (1981) 13 6R300].) [Lecture]
Schroder, K.; Clausen, E.; Sandberg, A. M.; Raa, J.
pp. 480–483 (1980) [18 ref. En] [Inst. of Fisheries, Univ. of Tromso, Tromso, Norway]

A bacterial isolate (code name UTC 101-11) resembling *L. plantarum* was obtained from the gut of saithe (*Gadus virens*) and subjected to various studies including: detn. of growth and metabolism in 3 liquid media; measurement of lactic acid production; analysis of cells for diamino pimelic acid; examination of antibiotic production via growth kinetics and plate diffusion assays utilizing *Vibrio* sp.; and examination of the production of an antibiotic culture filtrate, antibiotic production by *L. plantarum* being triggered by adding culture filtrates of other bacteria (e.g. *Bacillus thuringiensis*) to the growth medium. The *L. plantarum* isolate was able to kill a mixed culture of catalase-positive bacteria, after an initial phase of rapid growth by the catalase-positives. The catalase-positives died before the pH had dropped to a bactericidal level, suggesting that the isolate produces antibacterial principles other than acid. However, filtrates of the isolate grown in shake culture had no detectable antibiotic activity, unless extracts of other bacteria were added to the medium prior to growth of the isolate. The mode of action of the antibacterial factor(s) produced by the isolate is not yet known. JA

95

The differentiation of *Leuconostoc oenos* from non-acidophilic species of *Leuconostoc*, and the identification of five strains from the American type culture collection.

Garvie, E. I.; Farrow, J. A. E.
American Journal of Enology and Viticulture 31 (2) 154–157 (1980) [13 ref. En] [Nat. Inst. for Res. in Dairying, Shinfield, Reading RG2 9AT, Berkshire, UK]

5 strains of leuconostocs isolated from Japanese wine and deposited in the American type culture collection under various sp. names are considered to belong to the sp. *Leuconostoc oenos*. This opinion is based primarily on the properties of their lactate dehydrogenase and glucose-6-phosphate dehydrogenase. AS

96

[Changes in the composition of wine caused by growth of lactic acid bacteria.]
Kadymova, R. A.
Vinodelie i Vinogradarstvo SSSR No. 5, 20 (1980) [Ru]

Lactic acid bacteria *(Lactobacillus plantarum, L. brevis, L. buchneri)* isolated from mature wine were inoculated into young wine to determine the effects of their subsequent development. It was established that in young wines with a low titratable acidity due to the absence of malic acid, growth of these bacteria should be prevented as their presence could result in a considerable increase in the contents of volatile acids, diacetyl and acetoin. The wines acquire a "sauerkraut" off-flavour and the overall flavour is coarse and peroxidized. STI

97

Spray-dried acidophilus milk powder.
Gandhi, D. N.; Anil Kumar, P. A.
Indian Dairyman 32 (8) 599–600 (1980) [8 ref. En] [Div. of Dairy Bact., Nat. Dairy Res. Inst., Karnal-132 001, India]

Effects of spray-drying on the viability of *Lactobacillus acidophilus* and on the antibacterial activity of acidophilus milk were investigated. Acidophilus milk was prepared by a standard method and supplemented with skim milk, gelatin and lactose to increase the TS to 24% and was spray-dried after homogenization. During drying, the inlet and outlet temp. were maintained at 18°C and 90°C resp., and the speed of the atomizer was set at 20 000–24 000 rev/min. No changes in antibacterial activity were observed in the reconstituted dried product. Though the number of *L. acidophilus* cells in dried acidophilus milk was comparatively low (9.04×10^5/g), they fermented milk within 12 h at 40°C, when 1–3% of the powder was used as inoculum. The dried product, stored at 30° and 40°C showed inhibitory action against *Escherichia coli, Bacillus cereus* and *Micrococcus flavus* even after 3 months storage although no viable bacteria could be detected in it. During fermentation, inhibitory substances which are resistant to spray-drying may be produced. Storage at refrigerator temp., however, showed the presence of viable cells and antibacterial activity even after 3 months. CFTRI

98

[Effect of ripening of cold stored milk on some rheological properties of coagulum.] Etude de l'influence de la maturation des laits conserves au froid sur certaines proprietes rheologiques des coagulums. [Thesis]
Maderiaga Aguilar, O. E.
90pp. (1979) [93 ref. Fr] Nancy, France; Institut National Polytechnique de Lorraine

Reconstituted low-heat spray-dried skim milk was held at 4°C for 24 h and then coagulated with rennet either immediately (with or without addition of lactic acid) or after incubation at 10°, 12°, 15° or 20°C for up to 24 h in the presence of a *Streptococcus lactis* culture and $CaCl_2$ (added at a rate of 0.1 g/kg milk). Rheological studies made on the resulting curds showed that ripening of the milk (by incubation with *Str. lactis*) restored the coagulation properties lost during storage at 4°C for 24 h; the flocculation and coagulation times were reduced and the firmness of the curd increased. For the same acidity at renneting, rapid ripening at 20°C for 7 h gave a firmer curd than that obtained by a slower ripening at 10°C for 24 h. MEG

99

[Some recent views on production and use of pure dairy cultures.]
Teply, M.; Lukas, A.; Dedek, M.
Prumysl Potravin 30 (4) 202–203 (1979) [Cs] [Vyvojovy Zavod Mlekarenskeho Prumyslu, Prague, Czechoslovakia]

This article deals with various aspects of dairy cultures, such as the methods of their preparation, including isolation of new strains and propagation; single and mixed strain cultures; selection of cultures for particular products; and the effects of the milk used on multiplication of dairy cultures. [See also following abstract.] FL

100

[Some recent views on production and use of pure dairy cultures. II.]
Dedek, M.; Lukas, A.; Teply, M.
Prumysl Potravin 30 (6) 324–326 (1979) [14 ref. Cs] [Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

This is a review of recent work on dietetic and therapeutic functions of dairy cultures, containing for instance *Lactobacillus acidophilus* and *Bifidobacterium bifidum* as used in various cultured products, composition of special mixed cultures for specific uses in dairy products (cultured products and cheeses) and new methods for the manufacture of dairy cultures by freeze-drying and freezing at −30° to −40°C and freezing in liquid N_2 at −196°C. [See also following abstr.] FL

101

[Possibilities of shortening fermentation of acidophilus milk.] Möglichkeiten zur Verkürzung der Fermentation bei Acidophilus-Milch.
Miller, B.; Puhan, Z.
Schweizerische Milchwirtschaftliche Forschung 9 (3) 49–56 (1980) [19 ref. De, fr, en] [Inst. für Lebensmittelwissenschaft, Eidg. Tech. Hochschule, Zurich, Switzerland]

Various methods were studied to shorten the fermentation time of a fast or a slow acid-producing

strain of *Lactobacillus acidophilus* in inhibitor-free UHT milk. β-galactosidase, Pronase and trypsin were used for enzymic treatment of milk; and Lactovit A and Bios 2000 (Labor Wiesby, Niebüll, Federal Republic of Germany) bio-activators, commercial tomato juice and tomato puree, unhopped beer wort, tryptic peptone, and various pure amino acids, vitamins, salts and acids were tried as growth-promoters. Acidifying activity, titratable acidity, contents of L- and D-lactic acids, viscosity, lactose breakdown, bacterial counts and organoleptic tests were used in assessment. The best procedure involved addition of 1–5% tomato juice as source of growth substances for *L. acidophilus*, and addition of 500 p.p.m. peptone or 0.5 p.p.m. trypsin to the milk medium. Acidification time to pH 4.5 was thereby reduced from 55 to 24 h for the slow and from 31 to 19 h for the fast *L. acidophilus* strain. SKK

102

[Lactobacilli in Emmental cheese.] Die Laktobazillenflora des Emmentaler Käses. [Thesis]
El-Tobgui, H. A.-L.
88pp. (1978) [De] Munich, Federal Republic of Germany; Technische Universität

Strains of lactobacilli were isolated from Emmental cheese (with or without the fault of secondary fermentation) from 3 dairies; characteristics of the organisms were compared with those of 16 reference strains of lactobacilli. Streptobacteria accounted for about 68% of the 609 strains isolated; betabacteria and thermobacteria accounted resp. for 19% and 9% of strains. The number of thermobacteria decreased during ripening; about 60% occurred in the faulty cheeses. Betabacteria occurred in the faulty cheeses only from the 16th wk of ripening. Streptobacteria were more common in the faulty than in the normal cheeses. The fault of secondary fermentation cannot be attributed solely to lactobacilli – indeed no causal lactobacilli could be identified. [From *Milchwissenschaft* (1979) 34 (8) 505.] RBS

103

[Process for making smetana.]
Dilanyan, Z. Kh.; Melikyan, V. M.; Sarkisyan, R. A. **(Union of Soviet Socialist Republics,** Erevanskii Zootekhnichesko- veterinarnyi Institut; **Union of Soviet Socialist Republics,** Erevanskii Institut Narodnogo Khozyaistva)
USSR Patent 745 473 (1980) [Ru]

Smetana is made by incubating cream with a culture including *Streptococcus lactis* and *Streptococcus diacetilactis*, packaging and storing at optimum temp. To extend the shelf life and increase the biological value and usefulness of the product, the culture used comprises strains of *Str. lactis* No. 877, *Str. lactis* No. 775 and *Str. diacetilactis* No. 1506, with no or only a low proteolytic and lipolytic activity. The streptococci are used in about equal proportions. W&Co

104

[Ripening of Prato cheese: effect of adding *Pediococcus* on the speed of ripening.]
Martins, J. F. P.; Mori, E. E. M.; Figueiredo, I. B.; Fernandes, A. G.
Coletanea do Instituto de Tecnologia de Alimentos 10, 141–151 (1979) [18 ref. Pt, en] [Inst. de Tecnologia de Alimentos (ITAL), Campinas, Sao Paulo, Brazil]

3 batches were made of Prato Lanche cheese (1 kg) and 1 batch of traditional Prato cheese (4-kg cylinder). Half of each batch (control) was made with 0.6–1% BD starter [see preceding abstr.] and the other half was made with a combination of this starter and 0.1–0.3% *Pediococcus pentosaceus*. The ripeness index (soluble N as % of total N) in the 1st 2 wk of ripening increased slightly more rapidly in cheeses with *P. pentosaceus* than in control cheeses. Organoleptic scores for flavour and texture, however, were generally mediocre after 2–4 weeks' ripening, with *P. pentosaceus* having no detectable effect on flavour. It is thought that more conclusive results may be obtained in future by better choice of the sp. and strains of pediococci and by study of their symbiosis with the BD starter bacteria and lactobacilli. AW

105

[New developments for use of bifidobacteria in dairy plants.] Neue Erkenntnisse zur Kultur der Bifidobakterien im milchverarbeitenden Betrieb.
Kurmann, J. A.
Schweizerische Milchzeitung 107 (6) 29–30 (1981) [9 ref. De]

The author reviews mainly the production of cultured milks containing bifidobacteria, covering treatment of the milk used, cultures, fermentation in a tank or retail container and survival of bifidobacteria in stored products. Products in which bifidobacteria are used include 'sweet' bifidobacteria milk, cultured products, fresh cheese and ripened cheese. FL

106

Inoculation of beef steaks with *Lactobacillus* species before vacuum packaging. I. Microbiological considerations.
Hanna, M. O.; Hall, L. C.; Smith, G. C.; Vanderzant, C.
Journal of Food Protection 43 (11) 837–841 (1980) [24 ref. En] [Dep. of Anim. Sci., Texas Agric. Exp. Sta., Texas A&M Univ., College Station, Texas 77843, USA]

Biceps femoris steaks were inoculated with each of 4 *Lactobacillus* sp. (atypical streptobacteria and betabacteria) at a high or low level of cell concn. [approx. 10^8 or 10^5 cells/steak, resp.], vacuum-packaged and stored for up to 35 days at 1–3°C. Total lactobacillus counts of inoculated steaks were numerically higher than those of corresponding control (non-inoculated) steaks at nearly all of the storage intervals tested. Differences in lactobacillus counts between steaks inoculated with a high concn. of *Lactobacillus* cultures 5, 8 and 642, and those of control steaks usually were significant ($P > 0.05$) after storage for 0 to 28 days. Differences in lactobacillus counts between steaks inoculated with a low concn. of *Lactobacillus* cultures and those of control steaks were seldom significant ($P < 0.05$). After storage for 35 days at 1–3°C, differences in lactobacillus counts of inoculated (high or low levels of inoculum) and control steaks usually were not significant ($P > 0.05$). The lactobacilli encountered on the inoculated steaks consisted primarily of the type added by inoculation. AS

107

Inoculation of beef steaks with *Lactobacillus* species before vacuum packaging. II. Effect on meat quality characteristics.
Smith, G. C.; Hall, L. C.; Vanderzant, C.
Journal of Food Protection 43 (11) 842–849 (1980) [22 ref. En] [Dep. of Anim. Sci., Texas Agric. Exp. Sta., Texas A&M Univ., College Station, Texas 77843, USA]

Biceps femoris steaks (n = 432) were inoculated with each of 4 *Lactobacillus* sp. (atypical streptobacteria and betabacteria) at a high or low level of cell concn., vacuum-packaged, stored for up to 35 days at 1–3°C, displayed under retail conditions for 3 days and subsequently cooked for sensory panel analysis. Although there was some evidence that use of high level, rather than low level or no, inoculation with *Lactobacillus* cultures resulted in the lowest muscle surface pH and the brightest muscle colour, the least surface discoloration and the highest overall appearance ratings following storage for 0–35 days, there were negative effects which negated efficacy of high level inoculation. Negative effects of use of high level, rather than low level or no, inoculation with *Lactobacillus* cultures included the highest incidence of off-odour, the highest incidence of defects during retail display (most extensive surface discoloration, and peripheral discoloration, least desirable overall appearance) and the lowest palatability (juiciness, tenderness, flavour and overall palatability) ratings. Few of the differences among steaks were statistically significant but the preponderance of evidence (largely that based on numerical differences) suggests that inoculation with the *Lactobacillus* cultures used in this study will not improve storage life, retail caselife or palatability of beef. [See preceding abstr. for part I.] AS

108

Studies on the effects of several spices on the growth of *Lactobacillus casei* YIT9018.
Park, S. Y.; Yun, Y. H.; Kim, H. U.
Korean Journal of Animal Science [Hanguk Ch'uksan Hakhoe Chi] 22 (4) 301–308 (1980) [6 ref. En, ko] [Coll. of Agric., Seoul Nat. Univ., Suwon, S. Korea]

L. casei, grown in TGY broth (0.5% tryptone, 0.1% glucose and 0.3% yeast extract), was challenged by aseptic additions of 1–5% garlic, 0.1–0.5% ginger, 1–4% red pepper or 1–4% welsh onion preparations. Addition of unheated garlic, ginger or red pepper had an inhibitory effect on growth of *L. casei*, and welsh onion had a slightly stimulatory effect on growth. Heating the spices at 90°C for 10 min destroyed most of the growth inhibition activity. With the unheated spices, addition of 10% skim milk to the TGY broth had a protective effect on growth of *L. casei* in the presence of 0.4% ginger, but not in the presence of 4% garlic. From these results it is concluded that the amounts of spices used in Korean foods are unlikely to have an adverse effect on growth of *L. casei*, particularly if the foods have been cooked at high temp. MEG

109

Survival of *Lactobacillus casei* YIT9018 in acidic environments.
Kim, H. U.; You, K. H.; Lee, D. S.; Goh, J. S.
Korean Journal of Animal Science [Hanguk Ch'uksan Hakhoe Chi] 22 (4) 291–300 (1980) [23 ref. En, ko] [Lab. Dairy Tech. & Microbiol., Coll. of Agric., Seoul Nat. Univ., Suwon, S. Korea]

L. casei YIT 9018 was grown in MRS broth in the presence of acetic, lactic or citric acids at 50–128mM concn. Numbers of viable cells decreased during incubation at 37°C when the concn. of lactic acid was >94mM. In the presence of 75mM acetic acid, numbers of viable *L. casei* cells increased after an initial lag phase of 12 h, and max. numbers were reached 72 h; at a higher concn. of acetic acid (100mM), max. viable cell counts (reached in 48 h) were much lower than with 75mM acetic acid. In the presence of 75 or 100mM citric acid, numbers of viable cells decreased markedly during incubation at 37°C for 96 h. Addition of peptone, sucrose or dried skim milk to MRS broth (containing 100mM lactic acid) increased the number of surviving cells. The protective effect increased with increasing amounts of additives, and was most marked with 15% dried skim milk. A mixture of lactic and acetic acids or lactic and citric acids had a more inhibitory effect on growth of *L. casei* than the individual acids added separately. MEG

110

Powder composition comprising viable bifidobacteria cells containing powder and lactulose containing powder.
Ogasa, K. (Morinaga Milk Industry Co. Ltd.)
British Patent 1 582 068 (1980) [En]

Lactulose-containing powder was obtained by drying at 170°C inlet and 90°C outlet air temp. an aqueous lactulose solution containing 53.8% lactulose, 8.2% galactose and 6.3% lactose, plus 'Konnyaku powder'. The dried product with 78.2% lactulose was then mixed with an equal vol. of a dried preparation of bifidobacteria, preferably *Bifidobacterium adolescentis* or *B. bifidum*, obtained by fermentation under anaerobic conditions, followed by centrifugation to recover and concentrate bifidobacteria cells and finally freeze-drying. The final dried preparation contained 39% lactulose, 1.46% moisture, and had a viable count of 18×10^{10} bifidobacteria cells/g. FL

111

[Studies on formation and reduction of diacetyl in beer contaminated by *Pediococcus cerevisiae*.]
Diacetyl in Bier. Untersuchungen zu Bildung und Abbau von infektionsbedingtem Diacetyl in Bier.
Geiger, E.
Brauwelt 120 (46) 1680–1682, 1684, 1686, 1688, 1690–1692 (1980) [12 ref. De, en, fr] [Lehrstuhl für Tech. Mikrobiologie & Tech. der Brauerei II, Tech. Univ. München, 8050 Freising-Weihenstephan, Federal Republic of Germany]

Diacetyl formation and decomposition in beer is discussed with reference to: diacetyl formation by *Pediococcus cerevisiae* in various beer types (graphs

being given showing changes in diacetyl and 2-acetolactate concn. in 6 beer types during fermentation); the increase in diacetyl concn. with increasing *P. cerevisiae* growth; reduction of diacetyl concn. by yeast metabolism; decomposition of acetolactate to diacetyl; temp. dependence of decomposition of diacetyl; effects of addition of freshly-fermenting beer to maturing beer on diacetyl decomposition; and decomposition of vicinal diketones. AJDW

112

[Preparation of lactic fermentations for pickle olives with "spray drying".]
Brighigna, A.; Pelagatti, O.
Industrie Alimentari 19 (6) 499–502 (1980) [9 ref. It]

Experiments were carried out using a Pabisch "Minispray HD" for spray-drying *Lactobacillus plantarum* (C_2–66–A, C_4–55 and C_2–33) isolated from brine. 12.5 g samples of biomass, separated centrifugally and diluted in 400 cm^3 water, gave 2 g dried product (moisture content 7.9%), which was stored at (i) ambient temp., (ii) 2°C or (iii) —18°C. After 1, 30, 90 and 180 days the number of organisms was counted. Graphs are given of the findings, which showed that the number of organisms decreased with time comparatively thus: (i) > (ii) > (iii). 200 mg samples of the dried lactic cultures were subsequently inoculated into 400 ml of a tomato juice based medium at 30°C and examined after 2, 4, 6, 10, 18 and 24 h to determine pH and thus assess biological activity, which was (ii) > (iii) > (i). In further tests dried lactic enzyme preparations stored at 2°C were used for preparation of table olives by the Sivigliano system from the 1978 olive crop (var. Nocellara Etnea). 15 l of 8% brine was added to each of 2 × 20 kg olives, with addition to the 2nd sample of 400 mg of lactic culture at 2°C, which had been stored for 3 months, and revitalized for 1 day in 400 ml tomato juice based medium. During fermentation of the olives pH, total acidity, sugars and microflora growth were studied. Results (tabulated) showed that after 12 days the 2nd sample had better fermentation with pH 4.27, and total acidity 2.3 g/l, equivalent values being reached only after 90 days in the 1st (control) sample. The number of cells present in the 2nd sample was 121 × 10^6/ml after 30 days, vs. 14.1 × 10^6/ml in the control. KME

113

[Utilization of liquid yeast containing various strains of thermophilic lactic acid bacteria.]
Guseva, V. I.; Nosova, R. I.; Buinyakova, T. L.; Bogatyreva, T. G.; Pochevskaya, L. S.; Sharova, O. F.
Khlebopekarnaya i Konditerskaya Promyshlennost'
No. 10, 28–30 (1980) [Ru] [VNIIKhP, USSR]

Liquid yeast with *Lactobacillus delbrückii* was tested as a substitute for the 30-1 strain in bread making; the effect on organoleptic properties of the finished product was investigated. The new strain accumulated organic acids, and synthesized aroma-forming compounds at a higher level and more rapidly. The yeast quality was assessed on the basis of acidity and fermenting and leavening power, 50–60% yeast being added to the flour. The fermenting time was 1–1.5 h shorter than the compressed yeast method, and the bread had light-coloured crumb, and appealing taste and flavour. The specific vol. was somewhat smaller. The mixture of lactic, citric and malic acids, acetaldehyde, alcohols, esters, carbonyl compounds etc. produced were favourable for the freshness of the bread. STI

114

[Use of dried concentrates of lactic acid bacteria in butter production.]
Rymaszewski, J.; Poznanski, S.; Kornacki, K.; Kramkowska, A.
Przeglad Mleczarski 29 (2) 9–11 (1980) [Pl] [Inst. Inzynierii & Biotech. Zywnosci, ART, Olsztyn, Poland]

2 freeze-dried cultures consisting of the following strains in proportions given in parentheses were used in industrial scale production of butter in the Lidzbark Warminski dairy factory in Poland: (i) *Streptococcus lactis* T. (0.3), *Str. cremoris* (0.8), *Str. diacetilactis* strains 57_{267} (0.2), 264 (0.2) and 601 (0.2), and *Leuconostoc cremoris* (0.5); and (ii) *Str. lactis* 192 (0.3), *Str. cremoris* 319 (0.8), *Str. diacetilactis* strains 673 (0.5), 601 (0.5), L 12 (0.5) and L 20 (0.5), and *L. cremoris* 1388 (0.5). For starter preparation, (i) and (ii) stored for 3 months at 4°C were inoculated at 1.5 g/150 l into skim milk pasteurized at 90°C for 30 min and cooled to 30°C, stirred for 15 min and incubated at 30°C for 14–16 h; a parallel control starter was prepared from a Hansen culture. The starters were added to sweet cream butter grain in the churn after whey separation at 3% of the wt. of butter, and the butters were made according to technological instructions in force. Butters were stored at 4°C for ≤ 3 months, and diacetyl contents determined initially and after 3 months; total counts and counts of coliforms, enterococci, anaerobic sporeformers and yeasts and moulds were also determined. Control and (i) and (ii) butters were assessed on EW [? extra, choice] qualitiy. No pathogenic staphylococci, streptococci or salmonellae were detected at any time, and all butters were of high microbiological quality. Total counts and counts of coliforms increased during storage in control butters, whereas they did not change in (i) and (ii) butters. SKK

115

Production and use of starter distillate for flavouring butter.
Jönsson, H.; Petterson, H.-E.; Andersson, K.; Johansson, S.
Milchwissenschaft 35 (8) 461–465 (1980) [12 ref. En, de] [Swedish Dairies' Ass., S-201 22 Malmö, Sweden]

A mixed strain starter of *Streptococcus diacetilactis* and *Str. lactis/cremoris*, that accumulates high concn. of α-acetolactate, was grown in a skim milk or whey medium, adjusted to pH 3.5 and steam distilled in an O_2 atmosphere. About 85% of available diacetyl was obtained when 10% of the original culture vol. had been evaporated. Distillates representing 10% of the culture vol. from various growth media had the following diacetyl and acetic acid contents resp. (mg/kg): 9% DM skim milk, 1369 and 610; 16% DM skim milk, 2124 and 594; 9% DM skim milk + 1.5 g citric acid/l, 2369 and 612; 9% DM skim milk + 3 g citric acid/l, 2666 and 848;

and 12% DM whey, 2286 and 559. Butter made by adding 0.07–0.14% distillate (containing approx. 2000 mg diacetyl/kg) during working of churned and washed cream, was comparable in flavour, oxidation stability and lipolytic activity to that made by the NIZO method. [See also FSTA (1978) **10** 4P553 & 4P554.] CDP

116

The new Rome dairy.
Anon.
Dairy Industries International 45 (1) 8–11, 14–15, 18–19, 77 (1980) [En]

An illustrated detailed account is given of the new Rome dairy, covering equipment and processes used. [See also FSTA (1981) **13** 7P1210.] FL

117

Inhibition of psychrotrophic bacteria in refrigerated milk by lactobacilli isolated from yogurt.
Martin, D. R.; Gilliland, S. E.
Journal of Food Protection 43 (9) 675–678, 682 (1980) [20 ref. En] [Anim. Sci. Dep., Oklahoma State Univ., Stillwater, Oklahoma 74074, USA]

A "milk-peroxidase" agar was prepared to select cultures of lactobacilli that most actively produce H_2O_2. *o*-tolidine and peroxidase contained in the medium reacted with H_2O_2 produced by the bacteria to form a coloured zone around the colonies during their formation on the agar at 37°C. There appeared to be no relationship between the size of zones surrounding the colonies on the agar medium and the amount of peroxide produced in milk at 5.5°C. Cells from frozen conc. cultures of selected lactobacilli were added to milk to achieve desired populations in the interaction experiments. A significant inhibition of a psychrotrophic culture in autoclaved milk at 5.5°C occurred when at least 2.5×10^7 lactobacilli were added/ml. Larger numbers of lactobacilli resulted in greater inhibition of the psychrotroph. The intensity of inhibition of a psychrotrophic culture in autoclaved milk varied among the cultures of lactobacilli tested. In most instances, the more active inhibitory cultures produced more peroxide in refrigerated milk than less inhibitory ones. In preliminary experiments, a culture of *Lactobacillus bulgaricus* selected by the above procedure produced no inhibitory effect against the growth of psychrotrophic bacteria in non-agitated raw milk at 5.5°C. AS

118

Behavior of *Enterobacter* species and *Hafnia* species in skimmilk during fermentation by lactic acid bacteria.
Rutzinski, J. L.; Marth, E. H.
Journal of Food Protection 43 (9) 720–728 (1980) [19 ref. En] [Dep. of Food Sci., Univ. of Wisconsin-Madison, Madison Wisconsin 53706, USA]

E. cloacae, *E. aerogenes* and 2 strains of *Hafnia* sp. were cultured individually in skim milk together with *Streptococcus lactis*, *S. cremoris* or with 1 of 2 commercial lactic starter cultures. Incubation was at 21° or 32°C, and the lactic culture inoculum was 0.25, 1.0 or 2.0%. Growth of *E. cloacae* and *E. aerogenes* was markedly inhibited by *S. lactis* and *S. cremoris* at 32°C, and less so at 21°C. The commercial starter cultures were less inhibitory than the individual lactic streptococci. An increase in inoculum of lactic acid bacteria was accompanied by an increase in inhibition of *Enterobacter* sp., especially at 32°C. Both strains of *Hafnia* were inhibited more by *S. lactis* than by *S. cremoris* and the commercial starter cultures. Incubation at 32° rather than 21°C and increasing the amount of added lactic starter culture increased inhibition of *Hafnia* sp. All of the test coliforms were partially or completely inactivated toward the end of the 15-h incubation, provided the necessary conditions prevailed. AS

119

Defined single strains of lactic streptococci in bulk culture for Cheddar and Monterey cheese manufacture.
Richardson, G. H.; Hong, G. L; Ernstrom, C. A.
Journal of Dairy Science 63 (12) 1981–1986 (1980) [22 ref. En] [Dep. of Nutr. & Food Sci., Utah State Univ., Logan, Utah 84322, USA]

Acid production and Cheddar cheese quality were improved at 3 cheese plants when undefined commercial blends of lactic cultures were removed and replaced with phage insensitive, single strains propagated either in pairs or in one multiple blend of 5 or 6 strains. The paired strain program worked in one plant for > 12 months with only 6 strains used during the last 7 months. 2 mutants replaced parent strains. The multiple blend worked for 6 months in 2 plants with only 1 mutant replacing a parent strain. Careful phage-activity monitoring and strain selection were necessary to assure optimal success of the programs. A refrigerated reserve culture was used to provide back-up for the primary blend in the plant using the paired strain program. Make time and final cheese pH were more uniform than when undefined culture blends were used. AS

120

Observations on the effect of inoculum pH on the growth and acid production of lactic streptococci in milk.
Ross, G. D.
Australian Journal of Dairy Technology 35 (4) 147–149 (1980) [10 ref. En] [Dairy Res. Cent., Dep. of Agric., Richmond, NSW 2753, Australia]

The effect of over-ripening starter inocula on subsequent acid production in milk was investigated using *Streptococcus cremoris* cultures at pH 4.3. Strain combinations $EB_2 + EB_4$, $EB_6 + EB_9$ and $ML_1 + Z_8$ and single strain FG_2 were tested. The $EB_2 + EB_4$ inoculum showed a longer initial lag in acid production than did the other inocula. Max. specific growth rates at 30°C of pH 4.3 inocula were not significantly different from those of pH 4.7 (control) inocula, but rate of pH change was lower, and initial lag phase was slightly longer. Chilling of the inoculum at 5°C had no effect on subsequent acid production, but holding at 25°C for ≥ 12 h reduced the rate of acid production; this demonstrates the importance of immediately chilling an over-ripe bulk starter. CDP

121

Purification and some properties of diplococcin from *Streptococcus cremoris* 346.

Davey, G. P.; Richardson, B. C.
Applied and Environmental Microbiology 41 (1) 84-89 (1981) [22 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

122

Dialysis continuous process for ammonium-lactate fermentation: improved mathematical model and use of deproteinized whey.
Stieber, R. W.; Gerhardt, P.
Applied and Environmental Microbiology 37 (3) 487-495 (1979) [24 ref. En] [Dep. of Microbiol. & Public Health, Michigan State Univ., East Lansing, Michigan 48824, USA]

Separate terms for substrate limitation and product inhibition were incorporated into an equation describing the rate of cell growth for the steady-state fermentation of lactose to lactic acid with neutralization to a constant pH by NH_3. The equation was incorporated into a generalized mathematical model of a dialysis continuous process for the fermentation, developed previously, in which the substrate is fed into the fermentor and the fermentor contents are dialysed through a membrane against water. The improved model was used to simulate the fermentation on a digital computer. Results agreed with previous experimental tests using whole whey as substrate. Further simulations were then made to guide experimental tests using deproteinized whey as substrate. Dried cheese-whey ultrafiltrate was rehydrated with tap water to contain 242 mg lactose/ml, supplemented with 8 mg yeast extract/ml, charged into a 5-l. fermentor without sterilization, adjusted in pH (5.5) and temp. (44°C), and inoculated with an adapted culture of *Lactobacillus bulgaricus*. The fermentor and dialysate circuits were connected, and a series of steady-state conditions was managed nonaseptically for 71 days. The fermentation of deproteinized whey relative to whole whey, with both highly concentrated, resulted in similar extents of product accumulation but at a lesser rate. AS

123

[Role of proteolytic enzymes in dairy product manufacture.]
Netherlands, Nederlands Instituut voor Zuivelonderzoek
Zuivelzicht 72 (51) 1108-1109 (1980) [Nl]

Towards the end of 1980 the Netherlands Institute for Dairy Research (NIZO) held a short information meeting at Ede on the role of proteases in dairy product manufacture. The following 4 papers presented at the meeting are summarized: Natural milk proteinase - occurrence and properties, by S. Visser. Proteolytic enzymes and UHT sterilized milk products, by F. M. Driessen. Milk-clotting enzymes, their action and possible applications in cheesemaking, by P. J. de Koning. Proteolytic enzymes of lactic acid streptococci and their significance for dairy product manufacture, by F. A. Exterkate. ADL

124

[Use of pure cultures in dairy processing.] [Lecture]
Pech, Z.; Minařik, R.
Prumysl Potravin 31 (10) 570-572 (1980) [Cs]

[Vyzkumny Ustav Mlekarensky, Prague, Czechoslovakia]

The authors discuss cultures employed in the manufacture of dairy products with particular referenc to yoghurt (where in Czechoslovakia *Pediococcus acidilactici* is often used instead of *Streptococcus thermophilus* because of its resistance to antibiotics); kefir (a suitable Czechoslovak mixed culture contains all the necessary microorganisms i.e. *Str. lactis*, leuconostocs, *Lactobacillus caucasicus*, *L. acidophilus*, *Torulopsis kefir* and *Saccharomyces fragilis*); cream ripening for buttermaking with a special culture active at low temp. (13-14°C); and cheeses such as Edam (where a mixed culture of *Str. lactis* and *Str. cremoris* supplemented with *Str. diacetilactis* or *L. casei* gave much better results than mono-cultures or unsupplemented cultures). In cheese manufacture use is now made of *L. plantarum* because of its antagonistic properties towards butyric acid bacteria. [See FSTA (1981) 13 8P1333.] FL

125

Deoxyribonucleic acid homology among lactic streptococci.
Jarvis, A. W.; Jarvis, B. D. W.
Applied and Environmental Microbiology 41 (1) 77-83 (1981) [22 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

A comparison was made by deoxyribonucleic acid homology of 45 strains of lactic streptococci, using 2 strains of *Streptococcus cremoris* and 3 strains of *S. lactis* as reference strains. All *S. cremoris* strains were grouped together by deoxyribonucleic acid homology. *S. lactis* strains formed a 2nd group, except that 3 strains of *S. lactis* showed a high degree of homology with *S. cremoris* strains. The 3 *S. diacetylactis* strains could not be differentiated from *S. lactis* strains. In spite of these differences between *S. lactis* and *S. cremoris* strains, the majority of *S. cremoris*, *S. lactis*, and *S. diacetylactis* strains studied had at least 50% of their base sequences in common. In contrast, *S. thermophilus* strains generally showed little relationship with the other strains of lactic streptococci. The relevance of these findings to the selection of starter strains for cheesemaking is discussed. AS

126

Bacteriophage production following exposure of lactic streptococci to ultraviolet radiation.
Terzaghi, B. E.; Sandine, W. E.
Journal of General Microbiology 122 (2) 305-311 (1981) [12 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Single colony isolates of strains of *Streptococcus diacetilactis*, *Str. lactis* and *Str. cremoris*, most of which have been utilized for cheesemaking in New Zealand, were UV-irrated and their growth response was followed optically. All 45 strains showed either lysis or impairment of growth. Their concentrated, bacteria-free supernatants were examined by electron microscopy for

the presence of phage particles. Intact phages were observed in most lysates, while disrupted phage parts were found in the remaining lysates. Plaque-forming ability was demonstrable in a few cases. Lysogenization of a different strain by one of the phages detected by this technique was attempted. Similarities and differences with respect to lytic phages which have been isolated for these same strains in New Zealand cheese factories are discussed in relation to the possible origin and control of phages. AS

127

The use of modified lactic agar for estimating freeze-thaw injury in cultures and concentrates of lactic streptococci.
Woodward, G. J.
Dissertation Abstracts International, B 41 (3) 880–881; Order no. 80-20906 (1980) [En] [Cornell Univ., Ithaca, New York 14850, USA]

Lactic agar acidified to pH 5.2 with H_3PO_4 was the most sensitive of various modified lactic agars tested as an indicator of freeze/thaw (freezing at —20° or —196°C then rapid thawing) injury in lactic streptococci. 3 *Streptococcus lactis* strains tested were all more resistant to acid and to freeze/thaw injury when cultured in buffered growth medium than in milk. Cells harvested in the early stationary phase of growth survived liquid N_2 storage better than those harvested in the logarithmic phase. In one strain of *Str. cremoris,* storage temp. was inversely related to acid-producing activity, proteolytic activity and survival, and directly related to injury; changing temp. from —79°C to —196°, —40°, —30° or —20°C during storage had no significant effect on the concentrates. Storage at temp. above —30°C resulted in a deterioration of culture concentrate performance. CDP

128

Effect of ingesting *Lactobacillus acidophilus* milk upon fecal flora and enzyme activity in humans.
Ayebo, A. D.; Angelo, I. A.; Shahani, K. M.

Milchwissenschaft 35 (12) 730–733 (1980) [38 ref. En, de] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska 68583, USA]

During the first 4 wk of an 8 wk feeding trial, a group of 6 volunteers received a normal diet supplemented with three 8-oz cups of low-fat (2%) milk daily, while a 2nd group had their normal diet supplemented with three 8-oz cups of unfermented acidophilus milk containing 2×10^6 viable *L. acidophilus* cells/ml. During the 2nd 4-wk period there was a supplement switchover between the 2 groups. Ingestion of normal milk or acidophilus milk had no significant effect on faecal total aerobic counts, but there was a decrease in faecal coliform counts and an increase in lactobacillus counts when each group consumed acidophilus milk. Faecal β-glucuronidase and β-glucosidase activities decreased when acidophilus milk was ingested. These enzymes have been reported to be involved in the conversion of procarcinogens to carcinogens. MEG

129

Influence of sodium nitrite, temperature, and lactic acid bacteria on the growth of *Brochothrix thermosphacta* under anaerobic conditions.
Collins-Thompson, D. L.; Rodriguez Lopez, G.
Canadian Journal of Microbiology 26 (12) 1416–1421 (1980) [28 ref. En, fr] [Dep. of Environmental Biol., Univ. of Guelph, Guelph, Ontario, Canada N1G 2WI]

In commercial vacuum-packed bologna, growth of *Brochothrix thermosphacta was* limited at 5°C during a 4-week storage period. Factors controlling the growth of this organism were associated in part with certain lactobacilli isolated from the meat. The lactic acid bacteria associated with the decline of *B. thermosphacta* and overall spoilage of vacuum-packed bologna were isolated and identified. The principal organisms were *Lactobacillus brevis, Lactobacillus buchneri, Lactobacillus plantarum, Lactobacillus viridescens, Leuconostoc mesenteroides,* and certain streptococci. In associated growth experiments with *B. thermosphacta* at 5 and 15°C, *L. brevis* and *L. plantarum* showed the greatest antagonism towards the *Brochothrix* species. Studies with changes in incubation temp. (5 or 15°C) or nitrite levels (0–50 µg/ml) indicated that these two factors influence the antagonism but were minor compared with the influence of the lactic acid bacteria. AS

130

[Effects of the interaction of temperature, bacterial flora and vacuum level on salmonellae.]
D'Aubert, S.; Provera, D.; Simonetti, P.; Cantoni, C.
Industrie Alimentari 19 (10) 773–775 (1980) [24 ref. It] [Istituto di Ispezione degli Alimenti di Origine Anim., Univ. degli Studi di Milano, Milan, Italy]

Preliminary research into ways of eliminating salmonellae from stored foods has included studies of the effect of water activity (a_w), pH, temp., presence of other bacteria, and lowering of redox potential. 30 samples of fresh sausages (for consumption after cooking) and 30 samples inoculated with *Salmonella typhimurium* at 10^4/100 g were vacuum wrapped in plastics film and stored at 4°C. Other samples were kept at 22°C. At 0 and 4 days they were analysed for salmonellae and lactobacilli, and a_w and pH were determined. Results (tabulated) showed total disappearance of salmonellae and a massive increase in lactobacilli in all cases after 3 days, whether kept at 4°C or at 22°C. KME

131

[Effect of bacterial starters on the quality of air-dried sausages.]
Buyanov, A. S.; Khorol'skii, V. V.; Tsvetkova, N. N.
Myasnaya Industriya SSSR No. 5, 36–38 (1980) [5 ref. Ru] [Moskovskii Tekh. Inst. Myasnoi i Molochnoi Promyshlennosti, Moscow, USSR]

Technology of making sausages to be air dried is described; the product contains 2 strains of lactic acid bacteria as starters. Experimental samples and control samples (made without starter) were evaluated sensorily and chemically. Products with *Lactobacillus plantarum* 2P had the best sensory properties. Sausages

stored for a short time had increased total N in the fat extract; this indicates possible formation of an amino acid/lipid complex which may act as one of the factors determining the sausage ripening process. STI

132

Inhibition of *Staphylococcus* by lactic acid bacteria in country-style hams.
Bartholomew, D. T.; Blumer, T. N.
Journal of Food Science 45 (3) 420–425, 430 (1980) [22 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Lactic acid bacteria were tested for inhibition of staphylococci prevalent in country-style ham. Tests were conducted in broth and agar media and in a model meat system. *Lactobacillus plantarum* and *Pediococcus cerevisiae* were selected as antagonists against a strain of *Staphylococcus epidermidis* isolated from country-style ham. Culture introduction into muscle tissue was more effective by syringe injection than surface or puncture application. The model meat system was applied by using 27 hams in a 3 × 3 × 3 cubed factorial design experiment. The 3 factors were as follows: Sucrose at 20, 40, 60% of curing mixtures; salt equalization time at 0, 1, or 2 wk; and inoculation with *S. epidermidis* alone at 3.4×10^8 cells/g or at this level together with either *L. plantarum* at 2.2×10^8, or *P. cerevisiae* at 1.6×10^8 cells/g ham. 17 hams had at least some putrefactive spoilage due to *Clostridium sporogenes* or *Proteus vulgaris*. Spoilage was greatest at 0 time in equalization and for lowest sucrose levels. Ham pH was successfully monitored during processing by placing a pH probe in desired muscle areas, but this appeared to contribute to spoilage. *L. plantarum* inhibited *S. epidermidis* when the 60% sucrose treatment was used and acid production appeared necessary for staphylococcal inhibition to occur. IFT

133

A comparison of *Microbacterium thermosphactum* and lactobacilli as spoilage organisms of vacuum-packaged sliced luncheon meats.
Egan, A. F.; Ford, A. L.; Shay, B. J.
Journal of Food Science 45 (6) 1745–1748 (1980) [12 ref. En] [CSIRO Div. of Food Res., Meat Res. Lab., PO Box 12, Cannon Hill, Queensland 4170, Australia]

Spoilage of vacuum-packaged sliced luncheon meats at 5°C by *Microbacterium thermosphactum* and lactobacilli was studied using analytical taste panels. *M. thermosphactum* caused rapid spoilage, "Off" aroma was significant at about the time the bacterial population reached 10^8/g and "off" flavour 2–3 days later. In contrast, homofermentative lactobacilli caused spoilage much more slowly. No "off" aroma was detected with products which had carried a population of 10^8/g for 21 days, the time at which "off" flavour first became significant. Heterofermentative lactobacilli were intermediate in their effect. Thus shelf life is dependent on the types of bacteria present. Under such circumstances a "total count" microbiological standard is of little value. IFT

134

[Determination of bacteria responsible for rapid spoilage of beer.]
Savel, J.; Prokopova, M.
Kvasny Prumysl 26 (12) 265–267 (1980) [2 ref. Cs, ru, en, de] [Jihoceske Pivovary, n.p. Ceske Budejovice, Czechoslovakia]

Several lactic bacteria strains exist which differ greatly in their growth rate and ability to spoil beer. A technique for selective detn. of bacteria producing rapid spoilage of bottled beer is described. It involves use of a semi-solid medium consisting of beer, 0.2% agar and actidione. The experimental samples can either be processed in Petri dishes or inoculated into the medium. CO_2 serves as a selective inhibitor for any bacteria which may obscure the detn.; the CO_2 is forced into the medium at 0.12–0.14 MPa. The rapid spoilage bacteria are those which produce colonies in the medium within 7 days at 28°C. Potential utilization of this medium for routine microbiological control is discussed. STI

135

Beer-spoilage lactic acid bacteria. Principal characteristics and simple methods of their selective detection.
Nakagawa, A.
Bulletin of Brewing Science 24, 1–10 (1978) [29 ref. En] [Suita Lab., Brewing Res. Inst., Suita 564, Japan]

This report describes and tabulates the main characteristics of hop-tolerant lactic acid bacteria, and recommends 2 methods of detecting the beer-spoilage bacteria by using 2 selective media, the N medium [*United States Patent* (1971) 3 616 255; *British Patent* (1970) 1 193 975] and the BL medium [*Annual Report of Research Laboratories of Asahi Breweries Ltd.*, in the press]. Lactic acid bacteria can be detected irrespective of the presence or absence of yeast and at any stage of the brewing process. RM

136

[Biological reduction of acidity in young table wines.]
Kishkovskaya, S. A.; Bur'yan, N. I.; Moiseenko, D. A.; Shramko, L. S.
Vinodelie i Vinogradarstvo SSSR No. 3, 23–25 (1980) [Ru] [VNIIViV "Magarach", USSR]

The method is based on the action of added *Leuconostoc* and *Schizosaccharomyces* (10%) on grape must and young wine. Partial reduction of wine acidity by means of yeasts stimulated spontaneous malo-lactic fermentation. The resultant wines were of high quality with a soft, harmonious flavour and a pure varietal aroma. STI

137

[The microflora of sourdough. XI. Influence of temperature on the production of lactate and acetate in sourdoughs started with heterofermentative sourdough bacteria.] Die Mikroflora des Sauerteiges. XI. Der Einfluss der Temperatur auf die Lactat-/Acetatbildung in mit heterofermentativen Milchsäurebakterien angestellten Sauerteigen.
Spicher, G.; Rabe, E.
Zeitschrift für Lebensmittel-Untersuchung und

-Forschung 171 (6) 437–442 (1980) [10 ref. De, en] [Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Schutzenberg 12, D-4930 Detmold, Federal Republic of Germany]

Influence of temp. on production of acetate and lactate caused by heterofermentative sourdough bacteria of the genus *Lactobacillus brevis* var. *lindneri, L. Fermentum, L. buchneri* and *L. fructivorans* was investigated. Production of lactic and acetic acid varied between bacteria and was also dependent on sour dough temp. In general lactate production dependent to a greater extent on temp. than did acetate production. Between 25 and 35°C the quantity of acetate present after 24 h was more uniform than quantity of lactate. The organism most responsive to temp. was *L. fructivorans;* acid production greatly increased with increase from 25° to 35°C. Rise in acidity degree (NaOH equiv.) paralleled increase of lactic acid in doughs. [See FSTA (1981) **13** 3M221 for part X.] DIH

138

[The microflora of sourdough. XII. Influence of temperature on the production of lactate and acetate in sourdough started with homofermentative lactic acid bacteria.] Die Mikroflora des Sauerteiges. XII. Der Einfluss der Temperatur auf die Lactat-/Acetatbildung in mit homofermentativen Milchsäurebakterien angestellten Sauerteigen.
Spicher, G.; Rabe, E.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 172 (1) 20–25 (1981) [16 ref. De, en] [Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Schützenstrasse 12, D-4930 Detmold, Federal Republic of Germany]

Influence of temp. on production of lactate and acetate by homofermentative sourdough bacteria of the subgenus *Thermobacterium* and *Streptobacterium (Lactobacillus acidophilus, L. plantarum, L. farciminis, L. casei)* was investigated. The homofermentative sourdough bacteria produced in 18 h at 20–35°C differing quantities of lactate (0.5 g/100 g–1.6 g/100 g sourdough); production of lactate was influenced by temp. Acetic acid was formed as well in quantities of 0.05 g/100 g–0.15 g/100 g sourdough (compared with 0.25–0.3 g/100 g sourdough by heterofermentative sourdough bacteria). Production of acetate was not dependent on temp. [See preceding abstr. for part XL.] AS

139

Justification of the use of lactic starter and micrococci for the dairy industry.
Naguib, M. M.; Nour, M. A.; Tohamy, M. M.; Hofi, A. A.
Egyptian Journal of Dairy Science **8** (1) 1–7 (1980) [13 ref. En, ar] [Food & Dairy Res. Lab., Nat. Res. Cent., Dokki, Cairo, Egypt]

34 strains of lactic acid bacteria and micrococci isolated from raw milk or Egyptian Ras cheese, and 5 collection strains, were tested for lactic acid production at 37° and 30°C and proteolytic activity at 30°C. Developed acidity after 3 days at 30°C and formol number after 7 days at 30°C of the strains considered to be of most potential use to the cheese industry were resp.: *Streptococcus lactis* 1, 0.77% and 0.2; *Str. thermophilus* 6, 0.92% and 2.10; *Str. faecalis* 11, 0.74% and 0.23; *Lactobacillus bulgaricus* 5, 1.04% and 1.55; and *L. casei* 2, 2.34% and 1.82. The *Micrococcus* spp. were not acid producers, but strains 3, 5 and 9 were selected for their proteolytic activities (formol numbers) of 0.75, 1.35 and 1.60 resp. CDP

140

[*Streptococcus lactis* strain 162A used in starters for pickled cheeses.]
Ramazanov, I. U.; Vdovichenko, O. V.; Ramazanova, O. P.; Kvashnina, A. N. **(Union of Soviet Socialist Republics,** Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 739 097 (1980) [Ru]

Str. lactis strain 162A occurs as cocci and diplococci, rarely chains comprising 4 cells; the cells measure 1.2–1.5 µm in diam. Suitable media are hydrolysed milk, broth from hydrolysed milk and skim milk. In skim milk, a 5% inoculum gives coagulation after 5–6 h at 30°C. Optimum growth temp. is 30°C, min. 10°C and max. 43°C. The organism actively ferments glucose, maltose, lactose, mannitol and galactose, ferments sorbitol and raffinose weakly and does not ferment arabinose, starch, sucrose, rhamnose or glycerol. It multiplies in media containing up to 7.2–7.4% NaCl. FL

141

[*Streptococcus paracitrovorus* strain 199A, used in starters for pickled cheeses.]
Ramazanov, I. U.; Vdovichenko, O. V.; Ramazanova, O. P.; Kvashnina, A. N. **(Union of Soviet Socialist Republics,** Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 739 098 (1980) [Ru]

Str. paracitrovorus (Leuconostoc dextranicum) 199A occurs in chains of different length, and single and double cells; the cell diam. is 0.7–0.9 µm. It may be grown in agar with hydrolysed milk, broth from hydrolysed milk and milk. A 5% inoculum coagulates skim milk in 24 h; optimum growth temp. is 25°C, min. 10°C and max. 36°C. The critical acidity level is 65–75°T. It actively ferments glucose, lactose, galactose, sucrose and maltose, weakly ferments sorbitol and raffinose, and does not ferment mannitol, rhamnose, glycerol, arabinose or starch. It grows in media containing up to 6.0–7.0% NaCl. FL

142

[*Streptococcus cremoris* strain 912A, used in starters for pickled cheeses.]
Ramazanov, I. U.; Vdovichenko, O. V.; Ramazanova, O. P.; Kvashnina, A. N. **(Union of Soviet Socialist Republics,** Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 739 099 (1980) [Ru]

Str. cremoris 912A occurs as diplococci and chains comprising 3–4 cells; the cell diam. is 0.9–1.2 µm. It grows in agar with hydrolysed milk, hydrolysed milk broth and milk. A 5% inoculum coagulates skim milk in 7–8 h; optimum growth temp. is 28–30°C, min. 10°C and max. 38°C. Critical acidity level is 105°T. It actively

ferments glucose, lactose and galactose, weakly ferments sucrose, mannitol and raffinose, and does not ferment maltose, sorbitol, arabinose, glycerol or starch. It grows in media containing up to 6.0-6.5% NaCl. FL

143

[*Streptococcus diacetilactis* strain AP1 used in starters for pickled cheeses.]
Ramazanov, I. U.; Vdovichenko, O. V.; Ramazanova, O. P.; Kvashnina, A. N. **(Union of Soviet Socialist Republics,** Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 739 100 (1980) [Ru]

Str. lactis subsp. *diacetylactis* AP1 occurs as diplococci and chains of different lengths; the cell diam. is 0.8–1.0 µm. It grows in agar with hydrolysed milk and chalk, hydrolysed milk broth and milk. It coagulates skim milk in 7–8 h; optimum growth temp. is 30°C, min. 10°C and max. 40°C. The critical acidity level is 110°T. It forms diacetyl and acetoin, and actively ferments glucose, lactose, maltose and galactose, weakly ferments sucrose, arabinose, sorbitol and raffinose, and does not ferment mannitol, rhamnose, glycerol or starch. It grows in media containing up to 6.5–7.0% NaCl. FL

144

[*Streptococcus diacetilactis* strain 500A, used in starters for pickled cheeses.]
Ramazanov, I. U.; Vdovichenko, O. V.; Ramazanova, O. P.; Kvashnina, A. N. **(Union of Soviet Socialist Republics,** Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 739 101 (1980) [Ru]

Str. lactis subsp. *diacetlylactis* 500A occurs as diplococci and chains; the cell diam. is 1.0–1.2 µm. It can be grown in agar with hydrolysed milk, hydrolysed milk broth and milk. In skim milk a 5% inoculum gives coagulation in 6–8 h; optimum growth temp. is 30°C, min. 10°C and max. 40°C. The critical acidity level is 89–95°T. The organism produces diacetyl and volatile acids; it actively ferments glucose, lactose, maltose and galactose, weakly ferments sucrose, arabinose, sorbitol and raffinose and does not ferment mannitol, rhamnose, glycerol or starch. It grows in media containing up to 7.0–7.2% NaCl. [All the starter bacteria covered in this and 4 preceding abstr. are kept in the collection of Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti, USSR.] FL

145

Fatty acids liberated by mutants of lactic acid bacteria from milk fat.
Jasjit Singh; Ranganathan, B.; Harish Chander
Acta Microbiologica Polonica 29 (2) 157–159 (1980) [7 ref. En] [Div. of Dairy Bact., Nat. Dairy Res. Inst., Karnal, Haryana – 132001, India]

Streptococcus lactis subsp. *diacetylactis* and 4 UV-induced mutants, and *Lactobacillus bulgaricus* and *L. casei* and a γ-irradiation-induced mutant of each, were inoculated at 1% into steamed milk and incubated at 37°C for 48 h, then analysed for fatty acids (FA) released from the milk fat. The parent and mutant strains varied considerably in the numbers and amounts of FA released. The 2 lactobacilli mutants and 2 of the streptococci mutants yielded considerably more C18:1 FA than their parent strains, one other mutant yielded more C18:0 and C16:2, and the remaining mutant yielded more C12:0 and also appreciable amounts of C6:0 and C4:0 FA that were absent from the parent strain. The parent *Str. lactis* subsp. *diacetylactis* strain released only 10 FA whilst its mutants yielded between 11 and 17. CDP

146

Beta-galactosidase of *Streptococcus cremoris* H.
Jagota, S. K.; Ramana Rao, M. V.; Dutta, S. M.
Journal of Food Science 46 (1) 161–163, 168 (1981) [23 ref. En] [Dep. of Biochem., Panjab Univ., Chandigarh 160014, India]

β-Galactosidase (β-D-galactoside galactohydrolase, EC3.2.1.23) of *S. cremoris* H was partially purified by ammonium sulphate fractionation. Only 10% of the protein was recovered as enzyme protein and >50% of the enzyme in the crude extract was lost. A 2.6-fold purification only was achieved. The enzyme was most active at 65°C and recorded an optimum pH at 7.0. K_m and V_{max} with *o*-nitrophenyl β-D-galactopyranoside as substrate were recorded as 0.384 mM and 12.6 µmol/mg protein/min. Manganese ions activated the enzyme. The enzyme was strongly inhibited by Hg^{2+}, Ca^{2+}, Ni^{2+} and Ag^{+} as well as *p*-chloromercuribenzoate, and was activated by Mn^{2+}. IFT

147

[Strain of aroma-developing milk-acidifying streptococcus, *Streptococcus lactis* subsp. *diacetylactis*.]
Belova, G. A.; Kornelyuk, A. N.; Klimova, L. I.; Trofimova, T. I. **(Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti Nauchno-proizvodstvennogo Ob"edineniya 'Uglich')
USSR Patent 721 488 (1980) [Ru]

Morphological and culture characteristics of *S. lactis* subsp. *diacetylactis* strain TMPM V-1690, used in the bacterial preparation of cheese at low temp., are described. W&Co

148

[Bacterial starter for fresh pickled cheese.]
Ramazanov, I. U.; Ramazanova, O. P.; Vdovichenko, O. V.; Adzhiev, S. A.-Yu. **(Union of Soviet Socialist Republics,** Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 784 854 (1980) [Ru]

A starter for use in fresh pickled cheese manufacture comprises 4 *Streptococcus lactis* strains (C224, C15-3, C155 and 72), 2 *Str. cremoris* strains (P4 and 136) and 3 *Str. lactis* subsp. *diacetylactis* strains (Ap1, Ap2 and 123), mixed at a ratio of 1:1:2. The starter grows in media with 6.5–7% NaCl and the strains possess high proteolytic activity and lactic acid forming capacity. The starter gave high quality Karachev cheese with flavour typical of ripened-type cheeses. The salt-

tolerant strains are fully active in cheeses salted in the grain or by brining; and generally improve the quality of fresh cheeses by producing aroma substances. W&Co

149

[Bacterial starter for pickled cheese.]
Ramazanov, I. U.; Ramazanova, O. P.; Vdovichenko, O. V.; Suyunchev, O. A. **(Union of Soviet Socialist Republics, Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)**
USSR Patent 784 852 (1980) [Ru]

A starter for use in pickled cheeses (Osetinskii, Chankh, Tushinskii), which are kept in 18–22% brine for ≥6 months and contain at the end of the storage >8% NaCl, comprises *Streptococcus lactis* strains (162a, 808a, 20–3a and 283a), *Str. cremoris* (912a and 69a), *Str. lactis* subsp. *diacetylactis* (Ap1 and 500a), *Str. paracitrovorus (Leuconostoc dextranicum)* 199a and *Lactobacillus casei* 125. The streptococci are present at a ratio of 1:1:2:1 and the streptococci/lactobacilli ratio is 10:1. The bacteria grow in NaCl concn. of 6.5–7.4%; the streptococci possess high acid-producing capacity and strong proteolytic activity. FL

150

Bacteria associated with spoilage of braunschweiger.
Chyr, C. Y.; Walker, H. W.; Sebranek, J. G.
Journal of Food Science 46 (2) 468–470, 474 (1981) [24 ref. En] [Dep. of Food Tech., Iowa State Univ., Amers, Iowa 50011, USA]

Refrigerated braunschweiger was spoiled mainly by gram-positive, catalase-negative cocci identified as *Streptococcus faecalis* and *Pediococcus pentosaceus*. *P. pentosaceus* was isolated from sausage without nitrite held at refrigeration for 12 wk and from sausages made with 156 p.p.m. nitrite stored at 22°C for 21 days. It produced souring and a low pH in the sausage. *S. faecalis* was isolated from refrigerated sausages and produced a perfumy or scented odour under anaerobic conditions. *S. faecalis* survived 65°C for 5 min and 60°C for 60 min. *P. pentosaceus* at levels of 10^8 cells/ml broth survived 65°C for 5 min, but did not survive when the number of cells was 10^3/ml. IFT

151

Conversion of cystine or cysteine to the antibacterial compound Bis-(2-amino-2-carboxyethyl) trisulfide (Bactin) enhanced by ferric chloride and sodium nitrite.
Jonsson, S.; Raa, J.
Journal of Food Science 45 (6) 1641–1644, 1648 (1980) [25 ref. En] [Inst. of Fisheries, Univ. of Tromso, PO Box 488, N-9000 Tromso, Norway]

Heating of cystine at pH 6 or in HCl, yielded Bactin, which had a bacteriostatic action on *Lactobacillus plantarum* [under study with regard to fish preservation]. Heating of cysteine did not yield this compound, unless ferric chloride was present and the pH was low. In the presence of nitrite and ferric chloride, cysteine was efficiently converted to Bactin, also at pH 6. The bacteriostatic action was abolished by cysteine. The bacteriostatic action of nitrite may be due to facilitated conversion of cysteine to Bactin with a concomitant removal of thiol compounds, which otherwise abolish the bacteriostatic action. IFT

152

Detoxification of jojoba meal by lactobacilli.
Verbiscar, A. J.; Banigan, T. F.; Weber, C. W.; Reid, B. L.; Swingle, R. S.; Trei, J. E.; Nelson, E. A.
Journal of Agricultural and Food Chemistry 29 (2) 296–302 (1981) [13 ref. En] [Anver Biosci. Design Inc., Sierra Madre, California 91024, USA]

Removal of simmondsin and related toxicants from deoiled jojoba seed meal was investigated using food-grade *Lactobacillus acidophilus* and *L. bulgaricus* strains. Growth of *L. acidophilus* B-629 reduced levels of simmondsin and simmondsin 2'-ferulate from 4.9 and 2.3% meal initially to 1.1 and 0.25%, resp. Studies on suitability of the detoxified meal as an animal feed are reported. Nondetoxified jojoba meal is found bitter by humans; treatment with *L. acidophilus* gave a bland-tasting meal. Bitterness is not thought to be related to simmondsin content. DIH

153

[Can malic and citric acid serve as substrates for bacteria in wine capable of malo-lactic fermentation?]
Chauvet, J.; Buchot, P.; Dupuy, P.; Dubois, C.
Comptes Rendus des Seances de l'Academie d'Agriculture de France 66 (13) 1174–1179 (1980) [8 ref. Fr, en] [Cuvage Chauvet Freres et Cie, 71570 La Chapelle de Guindray, Dep. de Tech. des Produits Vegetaux, INRA, 21034 Dijon, France]

Malo-lactic fermentation produces a small quantity of volatile acidity. The phosphoroclastic reaction of pyruvate which produces acetic acid also generates enough ATP to support the growth of *Leuconostoc oenis* on malic and citric acid. AS

154

[Effect of mesophilic lactic acid bacteria starter on consumption of flour dry matter during fermentation.]
Vitavskaya, A. V.; Eltsova, O. P.; Orlyuk, T. M.; Matveev, A. I.; Kuznetsov, S. M.
Khlebopekarnaya i Konditerskaya Promyshlennost' No. 3, 20–21 (1980) [Ru] [Kazgipropishcheprom. USSR]

Consumption of flour DM during practical fermentation processes was studied. The dough was made from grade I wheat flour, with 1% yeast (sponge and dough process) or 1.5% yeast (straight dough). A control sponge was fermented for 5 h, an experimental batch (with 6% starter containing mesophilic lactic bacteria) for 3.5 h. Thin sponge dough was allowed to leaven for 1.5 h, and thick sponge for 40 min; straight dough for 5 h and an experimental batch containing 8% starter for 3.5 h. DM consumption was determined on the basis of ethanol in the sponge at the beginning and end of fermentation. Intermediate products were analysed for volatile acids, and temp. and moisture contents were monitored. DM consumption during fermentation is much higher with thick sponge; addition of starter reduces the consumption to a half in both thick and thin sponge dough. With straight dough, the addition of starter produces 2% economy of DM. With the one-phase method the economy of DM is considerable compared with the thin and thick sponge methods owing to the shorter technological process, in which biochemical and microbiological processes are accelerated, leading to rapid ripening of the dough. STI

155

Sour dough starter.
Kline, L.
United States Patent 4 243 687 (1981 [En]
A freeze-dried bakery composition comprises *Lactobacillus sanfrancisco* in a flour culture medium which has been subjected to incubation conditions suitable for the growth of the bacteria prior to freeze-drying. IFT

156

β-Galactosidases of lactic acid bacteria: characterization by oligosaccharides formed during hydrolysis of lactose.
Toba, T.; Tomita, Y.; Itoh, T.; Adachi, S.
Journal of Dairy Science 64 (2) 185–192 (1981) [23 ref. En] [Lab. of Anim. Products Tech., Coll. of Agric., Tohoku Univ., Sendai, Japan]
Strains of *Lactobacillus acidophilus, L. lactis, Streptococcus cremoris, Str. lactis* subsp. *diacetylactis, Str. lactis* and *Str. thermophilus* (1 of each) and 3 each of *L. bulgaricus, L. casei, L. helveticus* and *L. plantarum* were examined for β-galactosidase activity. Almost all of the cell-free extracts of the lactobacilli had high activity, whereas among the streptococci only *Str. thermophilus* had high activity. Hydrolysis products, resulting from the reaction of the cell-free extracts on 20% lactose solutions, were examined by paper chromatographic analysis. The number and amounts of oligosaccharides formed depended on the strain from which the cell-free extract was prepared, and it was possible to classify the strains into 4 groups according to their chromatographic patterns. Some properties of the β-galactosidases from 4 strains representing each of the groups (*L. bulgaricus* B-6, *L. helveticus* B-1, *L. lactis* L-3 and *L. plantarum* 118), are also presented. MEG

157

Development and commercial use of a multiple strain starter.
Daniell, S. D.; Sandine, W. E.
Journal of Dairy Science 64 (3) 407–415 (1981) [29 ref. En] [Dep. of Microbiol., Oregon State Univ., Corvallis, Oregon 97331, USA]
Potential lactic streptococcal starter strains were selected on the basis of insensitivity to phages, acid-producing activity, compatibility and lysogeny. Multiple strain starters, composed of 6 strains of *Streptococcus cremoris*, were introduced into 2 commercial cheesemaking plants. In plant (i) the starter was used as part of a 5-day rotation system, whereas in plant (ii) it was used exclusively. More variability in starter performance was observed in plant (i) than in (ii). This may be due to the introduction of phages from commercial starters used in (i). Phage development in plant (i) was indicated by an increase in the amount of starter required, whereas in (ii) the amount required did not vary with appearance of phage, and substitution of other strains did not slow down starter activity. These results indicate that phages in plant (i) attacked the dominant strain in the starter, whereas in plant (ii) less dominant strains were affected. The importance is stressed of not growing single strains together until the bulk stage. Bulk starter grown in whey-based medium with automatic pH control was more active than milk-grown bulk starter. MEG

158

[Gas-producing activity of aroma-forming bacteria in starters for the manufacture of small cheeses.]
Bgova, G. A.; Balakova, T. N.; Klimova, L. I.
Mlochnaya Promshlennost' No. 10, 18–19 (1980) [Russian] [Nauchno-proizvodstvennoe Ob"edinenie, Uglich, USSR]
Gas-producing capacity of 182 strains of *Streptococcus lactis* subsp. *diacetylactis* of high acidifying activity, 86 strains of the same species having low acidifying activity and 16 strains of *Leuconostoc citrovorum* was determined in a reconstituted dried whey medium at 8°C over 10 days, and at 8–10° or 12–14°C over 25 days. Great variations were exhibited in the rate and total quantity of gas produced by individual strains. The capacity of the bacteria to produce gas depended particularly on the temp. of incubation. At 8°C, all strains actively produced gas; at 12–14°C *Leuc. citrovorum* exhibited high gas production whilst at 8–10°C its gas production and that of *Str. lactis* subsp. *diacetylactis* was depressed, particularly in cultures of the latter with high acidifying power. The absence of gas, their inadequate or late development in low-temp. ripened cheeses ripening at 8–10°C is attributed in some degree to the low gas-producing activity of *Str. lactis* subsp. *diacetylactis* at this low temp. FL

159

Lactic streptococcal agglutinins: a review.
Sih, M. A.; Sandine, W. E.
Journal of Food Protection 43 (11) 856–858 (1980) [4 ref. En] [Dep. of Microbiol., Oregon State Univ., Corvallis, Oregon 97331, USA]
Agglutinins that cause clumping and settling of lactic streptococci are reviewed. Evidence defining the role played by agglutinins in sedimentation defects occurring during Cottage cheese manufacture is presented. The needs for a fast, simple and reliable agglutination test, and additional research on the influence of agglutinins on other fermented milk products, are noted. AS

160

Evaluation of lactic acid streptococci for the preparation of frozen concentrated starter cultures.
Jakubowska, J.; Libudzisz, Z.; Piatkiewicz, A.
Acta Microbiologica Polonica 29 (2) 135–144 (1980) [21 ref. En] [Inst. of Fermentation Tech. & Microbiol., Tech. Univ., ul. Wolczanska 179, 90-924 Lodz, Poland]
Streptococcus lactis subsp. *diacetylactis* 239 and *Str. lactis* 115 showed highest intracellular proteolytic activity when grown in APLC basal medium containing 1–1.5% lactose, 1% sodium citrate, 1% peptone and 0.5% yeast autolysate. After storage of frozen suspensions of 3 *Str. lactis* and 5 *Str. lactis* subsp. *diacetylactis* strains at −30°C for 10 wk, only 2 *Str. lactis* strains showed a decrease in viability. After frozen storage, all strains showed a shorter exponential growth phase and higher biomass in the optimum cultivation medium; this suggested that selection of the more active bacteria took place during freezing and storage. Acid production by the frozen culture was slower than that of the non-frozen culture, and markedly reduced; production of aroma compounds was also reduced, but casein hydrolysis was enhanced. Skim milk media showed potential as low-cost media for frozen conc. cultures. CDP

160

[Preservation of lactic acid bacria in non-conventional dehydration systes.]
Vilela, M. A. P.
Revista do Instituto de Laticinio Candido Toste 35 (212) 15–18 (1980) [9 ref. Pt] [Inst. de Laticinios Candido Tostes, Juiz de Fora, Minas Gerais, Brazil]

Selected strains of *Streptococcus lactis, Str. thermophilus, Str. cremoris* and *Lactobacillus bulgaricus* mixed with *Str. thermopilus* were cultivated in skim milk with 10% SNF until the start of the stationary phase of growth. After adition of 2% sucrose or 2% monosodium glutamae (in 0.1 M potassium phosphate buffer, pH 7.0) as protective agents, they were centrifuged to concentrate the cells in the sediment. Filter paper discs or porcelain beads were then impregnated with the sediment and placed in 2-l test tubes for subsequent drying under vacuum. After 30–90 days' storage at 0°C, the dried cultures were reactivated by incubation for 18 h in sterilized milk. Recovery was satisfactory in all cases: counts (log_{10}) of colony-forming units/ml were 7.93–9.53 with porcelain beads + sucrose, 8.05–9.27 with porcelain beads + monosodium glutamate, 8.15–9.53 with paper discs + sucrose, and 8.06–9.27 with paper discs + monosodium glutamate. The reactivated *L. bulgaricus* + *Str. thermophilus* culture produced the most acid. ADL

161

[Powdered milk production.]
House Shokuhin Kokyo KK
Japanese Examined Patent 5 543 755 (1980) [Ja]

Process is described in which a lactobacillus is cultured in a milk medium and the resulting produ is adjusted to a neutral pH, combined with dried milk and dried under vacuum. IFT

162

The ecological consequences of decontaminating raw meat surfaces with lactic acid.
Netten, P. van; Mossel, D. A. A.
Archiv für Lebensmittelhygiene 31 (6) 190–191 (19[illegible]) [14 ref. En, de] [Dep. of Sci. of Food of Animal Origin, Fac. of Vet. Med., Univ. of Utrecht, Netherlands]

The effect of lactic acid decontamination of fresh meat surfaces on the balance of the natural microflora was investigated. The skin of freshly slaughtered pigs was inoculated with Enterobacteriaceae from the colon contents at 10^4 colony-forming units/cm^2, and decontaminated with lactic acid. Treatment with 2% lactic acid solution at pH 2.5 produced the required lethality for Enterobacteriaceae within 1 min (2–3 log cycles reduction of counts) without reducing relative proportions of the components of the original bacterial association antagonistic to enteropathogens. RM

163

Volatile compounds associated with spoilage of vacuum-packaged sliced luncheon meat by *Brochothrix thermosphacta*.
Stanley, G.; Shaw, K. J.; Egan, A. F.
Applied and Environmental Microbiology 41 (3) 816–818 (1981) [17 ref. En] [CSIRO Div. of Food Res., North Ryde, NSW, Australia]

By using gas chromatography-MS, 7 volatile compounds were identified in vacuum-packaged sliced corned beef spoiled by *Brochothrix thermosphacta* under aerobic conditions. Acetoin and diacetyl appeared to be of major sensory significance. AS

164

Fermented sausage.
Satz, M. V. (Trumark Inc.)
United States Paent 4 238 513 (1980) [En]

Method for producing dry or semi-dry sausages is described, in which a meat emulsion is inoculated and fermented with *Pediococcus pentosaceus* ATCC 10791 as the lactic acid producing microorganism. IFT

165

[Degradation of bitter peptides by intracellular peptidase from lactic acid bacteria.]
Chiba, Y.; Sato, Y.
Japanese Journal of Dairy and Food Science [Rakuno Kagaku Shokuhin no Kenkyu] 29 (5) 161–167 (1980) [19 ref. Ja, en] [Lab. of Food Sci. & Tech., Nagoya Univ., Chikusa-ku, Nagoya, Japan]

Enzymes from *Streptococcus lactis* 527 were concentrated from a cell-free extract by $(NH_4)_2SO_4$ fractionation and resuspended in 0.05 M tris-HCl. The fraction precipitated by 40–100% saturation had the lowest proteinase activity (estimated using casein) but completely removed the bitterness from a bitter peptide solution. This fraction was separated by column chromatography on DEAE-Sephadex into 4 peaks with proteinase activity. Two of these peaks (with considerable peptidase activity against synthetic Leu-Gly and slight activity against Gly-Pro) were also active against bitter peptides, whereas a third peak (which had peptidase activity against Gly-Pro but not Leu-Gly) showed no activity against bitter peptides. Gel filtration of the active fractions on Sephadex G-200 gave 2 peaks. When these were subjected to chromatography on TEAE-cellulose, 2 active fractions were isolated and characterized as peptidases 1 and 2. Both peptidases hydrolysed Leu-Gly and Gly-Leu and peptidase 1 had some activity against Gly-Pro. Both formed single high mobility bands when subjected to polyacrylamide gel electrophoresis, and they represented 1.1 and 0.6% resp. of the protein in the crude extract. Both enzymes removed virtually all the bitterness from bitter peptide solution after incubation for 3–4 h. BWH

166

[Biochemical activity of lyophilized concentrates of lactic acid bacteria obtained by continuous cultivation.]
Krasnikova, L. V.; Silant'eva, L. A.; Gorbatova, K. K.; Vasil'ev, N. F.
Prikladnaya Biokhimiya i Mikrobiologiya 14 (3) 405–409 (1978) [15 ref. Ru, en] [Leningrad Tech. Inst. of Cold Storage Ind., Leningrad, USSR]

Proteolytic activity, size of casein precipitation zone, titratable acidity in 24-h cultures, and diacetyl contents were studied in 5 strains of *Streptococcus lactis*, 3 of *Str. cremoris*, 6 of *Str. lactis* subsp. *diacetylactis* and 2 of *Leuconostoc dextranicum* obtained from the collection of the All-Union Butter and Cheese Industry Research Institute (VNIIMS). Best representatives of the 4 spp. were selected, and mixtures of them (including a strong

and a weak strain of *Str. lactis* subsp. *diacetylactis*) were added at 2% in a 1:6:1:3:6 ratio to the culture medium and cultured continuously in a 2-stage laboratory fermenter at pH 6.2–6.4 and 29–30°C. The biomass was separated from the medium by centrifugation, mixed with a protective medium, and freeze-dried. The dried preparations were stored at 3–5°C for ≤6 months and examined periodically for survival, diacetyl formation, and acidifying and proteolytic activities. At the end of storage, survival was 40–45%, but biochemical activity had decreased much less markedly, e.g. diacetyl formation was 5.3 mg/l milk medium after 6 months vs. 7.6 mg/l initially. SKK

167

[Parameters affecting the activity of lactobacillus starter cultures.] Einflussgrössen bei der Aktivitätsbestimmung von Laktobazillen-Starterkulturen.
Junker, M.; Liepe, H.-V.
Fleischwirtschaft 61 (4) 623–624 (1981) [5 ref. De, en] [Fa. Rudolf Müller & Co., Giessener Strasse 94, D-6301 Pohlheim, Federal Republic of Germany]

The acid-forming activity of lactobacilli is a useful parameter for measuring the effectiveness of starter cultures in technological processes. The effects of pH, temp., substrate concn., and NaCl concn. on *Lactobacillus plantarum* L 74 (DSM number 1954) used in dry sausage making are discussed. The effect of other bacterial strains in mixed cultures, and of the above parameters must be borne in mind during determination of activity by the titration method described. AS

168

[The use of lactic acid in cucumber processing.]
Gonzalez Pellisso, F.; Rejano Navarro, L.; Duran Quintana, M. C.; Fernandez Diez, M. J.
Grasas y Aceites 31 (1) 13–21 (1980) [6 ref. Es, de, en, fr] [Inst. de la Grasa y sus Derivados, Seville, Spain]

Results are reported from cucumber fermentation trials in Andalucia. Experimental 5 kg vessels were used for fermenting cucumbers in 10% NaCl, inoculated with a pure culture of lactobacilli with the following modifications: (i) acidification with 0.2% lactic acid; (ii) buffering with 0.030 equivalents/l of lactate; (iii) buffering with 0.015 equivalents/l of NaOH. Treatments (ii) and (iii) were designed to prevent too quick a pH drop. Tabulated results show the changes in gram-negative bacilli, cocci, lactobacilli, yeasts, pH, free acidity and NaCl concn. during fermentation. High-acidity, low-acidity and sweet-sour gherkins were also prepared from fresh, fermented or brined cucumbers, packed in glass bottles with twist-off caps with or without pasteurization, and examined by chemical, microbiological and sensory analysis after various storage periods. Tabulated results from all the trials showed the fast fermentation rate and the beneficial effect of lactic acid addition. This eliminated gram-negative bacilli within 3 days, prevented growth of cocci and greatly enhanced growth of lactobacilli. No advantage was achieved by treatments (ii) and (iii). Acetic acid could be partly or completely replaced by lower concn. of lactic acid, with resulting shorter pasteurization time and no significant effects on organoleptic evaluation. RM

169

Use of microbial cultures: vegetable products. [Lecture]
Fleming, H. P.; McFeeters, R. F.
Food Technology 35 (1) 84–88 (1981) [73 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

This review begins by outlining the processes involved in the brine fermentation of vegetables: 2 flow charts are included of brine fermentation of vegetables in general and of cucumbers. Brine fermentation is still the primary method of vegetable preservation in the East and developing countries and, although secondary to modern processes (eg. canning, freezing) in the West, remains important for certain vegetables because of various benefits, e.g. yields desirable organoleptic properties, requires relatively little mechanical energy input. Consideration is next given to the desirability of supplementing the natural fermentation of such products by inoculating with lactic acid bacteria (e.g. *Lactobacillus plantarum, Pediococcus cerevisiae).* Other topics reviewed are the shelf-life, safety and nutritive value of fermented vegetables. Fermented vegetables have not been reported to be a significant source of food poisoning. Some vegetables, when properly and fully fermented, are shelf-stable without the need for heat processing. Fermentation does not greatly enhance and may even deplete some nutrients, but the resultant acidic and anaerobic conditions may increase the storage stability of some vitamins. The presence of salt helps prevent softening of the fermented vegetables and assists in directing the course of fermentation. [See FSTA (1981) 13 11B109.] JA

170

[Lactic acid streptococci resistant to phenol.]
Erzinkyan, L. A.; Pakhlevanyan, M. Sh.; Charyan, L. M.; Akopyan, L. G.; Madoyan, P. A.
Biologicheskii Zhurnal Armenii 33 (9) 879–883 (1979) [Ru, am, en] [Inst. Mikrobiol. AN ArmSSR, USSR]

171

[Strain of *Streptococcus diacetylactis* No. 563-S².]
Gudkov, A. V.; Fomichev, Yu. K.; Sel'skov, A. N.; Dokukin, V. M. **(Union of Soviet Socialist Republics,** Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 721 487 (1980) [Ru]

Morphological characteristics of *Str. lactis* subsp. *diacetylactis* No. 563-S², used for developing lysogenic strains of milk-clotting streptococci, are described. W&Co

172

The influence of selected antioxidants on diacetyl accumulation by lactic acid cultures.
Richter, R. L.; Gehrig, T. C.; Dill, C. W.; Blake, R. W.
Progress Report, Texas Agricultural Experiment Station PR3733-3751, 52–56 (1980) [8 ref. En]

2 commercial mixed-strain starters (containing *Leuconostoc cremoris* and *Streptococcus cremoris* and/or *Str. lactis*) were examined for diacetyl production in a skim milk medium containing 0.1% sodium citrate and 10, 25 or 50 p.p.m. antioxidant (sodium erythorbate, butylated hydroxyanisole (BHA) or butylated hydroxytoluene (BHT)). Up to 50 p.p.m.

BHT had no effect on diacetyl production. BHA inhibited diacetyl production during incubation at 22°C for up to 24 h, but after 36 h diacetyl production was only inhibited by the highest concn. of BHA (50 p.p.m.). In contrast, 0.1% sodium erythorbate increased diacetyl production. The similarity to the stimulatory effect of ascorbic acid on diacetyl production [see FSTA (1979) 11 11P1913] is discussed. MEG

173

Antibiotic resistances of yogurt starter cultures *Streptococcus thermophilus* and *Lactobacillus bulgaricus*.

Sozzi, T.; Smiley, M. B.

Applied and Environmental Microbiology 40 (5) 862–865 (1980) [16 ref. En] [Res. Dep., Nestle Products Tech. Assistance Co. Ltd., CH-1814 La Tour de Peilz, Switzerland]

29 strains of *L. bulgaricus* and 15 of *Str. thermophilus* were tested for resistance to 35 antibiotics, using the disk assay technique. All strains were sensitive to 0.5 μg ampicillin, 10 μg aureomycin, 5 units bacitracin, 50 μg carbenicillin, 30 μg cephaloridin, 30 μg cephalothin, 5 μg chloromycetin, 2 μg clindamicin, 1 μg dicloxacillin, 30 μg doxycycline, 2 μg erythromycin, 3 μg Mandelamine, 5 μg methicillin, 15 μg oleandomycin, 0.5 units penicillin G, 5 μg rifampin, 10 μg terramycin or 1 μg tetracycline. Most of *Str. thermophilus* and *L. bulgaricus* strains were resistant to neomycin and polymyxin B, both of which are used in mastitis therapy. Compared with previous results obtained by Reinbold & Reddy [see FSTA (1975) 7 10P2234], there was a marked increase in the number of *Str. thermophilus* strains that were resistant to antibiotics used in mastitis therapy. With *L. bulgaricus* there was a reduction in the number of strains resistant to certain antibiotics, for which resistance had previously been reported; no strains were resistant to tetracycline or oleandomycin. For the manufacture of yoghurt, it is considered prudent to use strains of *L. bulgaricus* and *Str. thermophilus* that are resistant to as few antibiotics as possible. In this way, unnecessary distribution of antibiotics-resistant strains is avoided. MEG

174

Purification and partial characterization of an aminopeptidase from *Lactobacillus lactis*.

Eggimann, B.; Bachmann, M.

Applied and Environmental Microbiology 40 (5) 876–882 (1980) [19 ref. En] [Lab. of Dairy Res., Swiss Fed. Inst. of Tech., 8004 Zurich, Switzerland]

Proteolytic enzymes of starter cultures play a major role in protein breakdown during the manufacture and ripening of cheeses. *L. lactis* produces at least 3 distinct surface-bound proteolytic enzymes, and this paper reports on the purification and partial characterization of aminopeptidase. AL

175

[Milk products made with *Lactobacillus acidophilus*.] Milchprodukte hergestellt mit *Lactobacillus acidophilus*.

Miller, B.

Schweizerische Milchzeitung 107 (38) 249; (39) 257; (40) 265; (41) 273–274 (1981) [32 ref. De] [Lab. für Milchwissenschaft, Eidg. Tech. Hochschule, Zurich, Switzerland]

This review-type article is divided into 4 parts dealing with (i) acidophilus milk prepared by fermentation with *Lactobacillus acidophilus* starter (with an outline of production processes used in 6 countries) and sweet acidophilus milk, (ii) cultured milk products with *L. acidophilus* and thermophilic lactic acid bacteria (acidophilus yoghurt, AcO yoghurt, Bioghurt), (iii) cultured milk products with *L. acidophilus*, mesophilic lactic acid bacteria and yeasts (acidophilus-cultured milk, acidophilin, acidophilus yeast milk, acidophilus beverage from buttermilk, acidophilus paste, acidophilus quarg, acidophilus butter and acidophilus cheese), and (iv) 3 types of dried acidophilus milk. FL

176

Production of acetoin and diacetyl by lactic acid bacteria in skimmed milk with added citrate and pyruvate.

Hegazi, F. Z.; Abo-Elnaga, I. G.

Zeitschrift für Lebensmittel-Untersuchung und -Forschung 171 (5) 367–370 (1980) [14 ref. En, de] [Dairy Dep., Univ. of Assiut, Assiut, Egypt]

Measurements were made of acetoin + diacetyl (A + D) and diacetyl produced by 32 strains of *Streptococcus, Leuconostoc* and *Lactobacillus* spp. in skim milk supplemented with pyruvate or citrate and in peptone - yeast extract - glucose (PYG) broth + pyruvate and peptone-yeast extract broth + pyruvate. Highest amounts of A + D (μmol/ml) were formed in skim milk + citrate by *Str. cremoris* AM_2 (22.42), *Leuc. citrovorum* (3.68), *Str. faecalis* subsp. *liquefaciens* (2.21), *L. casei* ATCC 393 (11.03), *L. casei* subsp. *alactosus* (10.66) and *L. xylosus* (8.82). There was considerable variation between and within strains in A + D production but, in general, citrate was a better source of carbon than was pyruvate. Most diacetyl tended to be produced by streptococci in skim milk + citrate and by lactobacilli in PYG broth + pyruvate. MEG

177

[Method for manufacture of freeze-dried lactic acid bacteria with increased survival rate.] Verfahren zur Herstellung von gefriergetrockneten Milchsäurebakterienkulturen mit erhöhter Überlebensrate.

Kunz, B.; Blümel, W.

German Democratic Republic Patent 145 926 (1981) [De]

To a special nutrient medium, preferably consisting of a mixture of peptone, yeast extract, glucose, lactose, NaCl and sodium acetate and which is pre-frozen, a bacterial culture, pre-cooled preferably to 257–279 K, is added, and the mixture is then freeze-dried. IN

178

Aberrant forms of *Streptococcus cremoris* HP.

Keogh, B. P.; Peterson, J. E.

Applied and Environmental Microbiology 41 (4) 1003–1009 (1981) [21 ref. En] [Div. of Food Res., Commonwealth Sci. & Ind. Res. Organization, Highett, Victoria, 3190, Australia]

The cheese starter strain, *Str. cremoris* HP produced variant colonies when streaked on the surface of solid media and incubated at 30° or 37°C or in the presence of penicillin. Serial plating and incubation at 37°C, or in the presence of penicillin, resulted in the production of variants. Subculture followed by incubation at 25°C, or in the absence of penicillin, resulted in the reversion or partial reversion to the parent form. Colony morphology and cell morphology exhibited the characteristics of the L-phase. Evidence suggested that the aberrant forms of *Str. cremoris* at 30°C were transitional phase variants, but at 37°C and in the presence of penicillin they were L-phase variants. Electron micrographs showed that the cell walls of the variant cells were defective and that there were differences in the density and the organization of the cytoplasmic constituents compared with the parent cell. AS

179

Nitrogen sources for growth of lactic streptococci in milk.

Mills, O. E.; Thomas, T. D.

New Zealand Journal of Dairy Science and Technology 16 (1) 43–55 (1981) [21 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Nitrogen nutrition of *Streptococcus cremoris* AM_2 and E_8 was studied by adding ^{14}C-labelled amino acids, peptides and milk proteins separately to unlabelled milk and then determining the incorporation of radioactivity into bacterial protein during growth. In the presence of essential ^{14}C-labelled amino acids, the specific radioactivity of bacterial protein reached a peak after 2–3 generations, and then fell sharply. This indicates that the free amino acids initially present in milk are an important N source for growth at low cell densities. The decline in specific activity as the cell density reached 8–16% of that found in coagulated milk cultures indicates that amino acids are then supplied increasingly from other sources. With ^{14}C-labelled peptides, similar specific activity values were obtained when the cells had undergone 1–5 generations, suggesting that the peptides originally present supplied an almost constant proportion of N for growth. With ^{14}C-labelled milk protein, the specific activity of bacterial protein progressively increased, indicating that milk protein becomes an increasingly important source of N for growth as the cell density increases. Caseins, β-lactoglobulin and α-lactalbumin were used as N sources by both strains tested. AS

180

Growth and aflatoxin production by *Aspergillus parasiticus* in the presence of *Lactobacillus casei*.

El-Gendy, S. M.; Marth, E. H.

Journal of Food Protection 44 (3) 211–212, 214 (1981) [14 ref. En] [Dep. of Food Sci., Food Res. Inst., Univ. of Wisconsin-Madison, Madison, Wisconsin 53706, USA]

When a mineral salts-glucose broth was inoculated simultaneously with *Aspergillus parasiticus* and *Lactobacillus casei* and incubated at 28°C for 10 days, larger numbers of *L. casei* survived than when the bacterium was grown alone; growth of *A. parasiticus* initially was more rapid, but total growth during incubation was comparable to that of the mould growing alone; production of aflatoxin was less than when the mould grew alone; and degradation of aflatoxin by the mould was somewhat greater than when the mould grew alone. Growth of *L. casei* for 3 days before adding *A. parasiticus* resulted in better survival of *L. casei* than when it grew alone, but not better than when the 2 organisms were added to broth simultaneously; slower growth of *A. parasiticus* than when it grew alone; production of less aflatoxin than when the mould grew alone or when both organisms were added to broth simultaneously; and no apparent degradation of aflatoxin during the 10-day incubation period. AS

181

The use of whey-derived phage-resistant starter strains in New Zealand cheese plants.

Jarvis, A. W.

New Zealand Journal of Dairy Science and Technology 16 (1) 25–31 (1981) [17 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Phage-resistant starter strains were derived from 3 strains of *Streptococcus cremoris*. After being introduced into commercial cheese plants, 1 strain reverted to sensitivity to the phage against which it was derived. Phages appeared for the other 2 strains that differed from the original phages. One of these phages had a wider host range than the phage which attacked the parent strain. It is suggested that whey-derived phage-resistant strains have more commercial application when used as single strains, rather than as components in paired or multiple starters. AS

182

Calcium-induced alteration of cellular morphology affecting the resistance of *Lactobacillus acidophilus* to freezing.

Wright, C. T.; Klaenhammer, T. R.

Applied and Environmental Microbiology 41 (3) 807–815 (1981) [29 ref. En] [Dep. of Food Sci., N. Carolina State Univ., Raleigh, N. Carolina 27650, USA]

Examination of factors affecting the resistance of *L. acidophilus* NCFM culture concentrates to freeze injury induced during frozen storage at −20°C revealed that Ca supplementation of the growth medium contributed to the storage stability of cells prepared in static culture. Culture concentrates of *L. acidophilus* NCFM were prepared from cells propagated in MRS broth or MRS broth supplemented with 0.1% $CaCO_3$, $Ca(OH)_2$ or $CaHPO_4$. After 28 days at −20°C,

concentrated cells (3.2×10^9 c.f.u./ml) prepared from MRS broth cultures showed an 84% reduction in viable cells. Of the remaining viable cells, 88% were sublethally injured and unable to form colonies on MRS agar supplemented with 0.15% bile. Cells prepared in Ca-supplemented MRS broths demonstrated more resistance to frozen storage. Viability and injury losses in the frozen concentrates were limited to 10–39% and 3–23%, resp. Ca supplementation of MRS medium resulted in a morphological transition of *L. acidophilus* NCFM from filamentous to bacilloid rods, and the bacilloid cells were more resistant to freezing and storage at conventional freezer temp. Results suggest that the morphology of the *L. acidophilus* cell may be an important consideration in the preparation of freeze-stable culture concentrates. AS

183

Rapid decrease of the adenosine triphosphate content in *Lactobacillus malii* and *Leuconostoc mesenteroides* after incubation with low concentrations of sulfite.
Hinze, H.; Maier, K.; Holzer, H.
Zeitschrift für Lebensmittel-Untersuchung und -Forschung 172 (5) 389–392 (1981) [18 ref. En, de]
[Gesellschaft für Strahlen- & Umweltforschung, Inst. für Toxikologie & Biochem., D-8042 Neuherberg, Federal Republic of Germany]

Addition of 1mM sulphite to a culture of *Lactobacillus malii* or *Leuconostoc mesenteroides* at pH 4.0 caused a rapid drop of the ATP content. At pH 6.0, the sulphite-stimulated depletion of the ATP level was somewhat diminished compared to the effect observed at pH 4.0. Incubation of the bacteria in the log phase with 2mM sulphite at pH 5.0 prevented growth completely. Cells of *Leuconostoc mesenteroides* in the log phase, incubated with 2mM sulphite for 2 h at pH 5.0, showed a nearly normal growth after shifting to a sulphite-free medium. Cells of *Lactobacillus malii*, treated under the same conditions with sulphite, multiplied significantly slower in a fresh medium, as compared to untreated cells. AS

184

Predigested soybeans. [Lecture]
Hernandez, J. L.; Adris, J.; Rank, E. F. de; Farias, R.; Samman, N.
Journal of the American Oil Chemists' Society 58 (3) 510–511 (1981) [En] [Catedra de Ind. Agric., Fac. de Agronomia & Zootecnia, Univ. Nacional de Tucuman, Argentina]

A process is described for the production of predigested soybeans for use in standard foods, replacing navy beans, chickpeas or lentils. Soybeans are dehulled, halved, soaked at room temp. in water + 200 g papain/kg for 12 h, submitted to lactic fermentation using *Lactobacillus acidophilus* and *L. bulgaricus*, for 24 h, neutralized, precooked, washed and dried. The product has increased levels of fat (22.38 vs. 21.45%) and protein (48.80 vs. 38.26%), and decreased fibre (3.85 vs. 5.16%), ash (2.19 vs. 4.85%) and carbohydrate (22.78 vs. 30.28%) levels compared to untreated soybeans. Nutritional value, inorganic constituents, phytates and available Fe, phosphatides, sugar composition, characteristics of soybean oil (only acid value is slightly higher for treated beans, other properties are the same in both), effect of complementing using predigested soybean oil, and human assays are also discussed. [See FSTA (1981) 13 12J1852.] LH

185

[Spontaneous fermentation in manufacture of Busaa beer in Kenya.] Imponderabilien der Selbstgärung bei der Herstellung des naturtrüben Busaa-Bieres in Kenia. [Review]
Kretschmer, K. F.
Monatsschrift für Brauerei 34 (2) 41–43 (1981) [16 ref. De]

Manufacture of Kenyan 'Busaa' beer, a lactic/alcoholic beer made from maize + millet, is described. Busaa resembles S. Africa Bantu beer but has a very short shelf-life (becoming undrinkable 3 days after it is ready to consume). Data are presented for the pH, lactic acid content and alcohol content of Busaa and Bantu beer and for the pH and lactic acid content of other beers. The role of Busaa as a source of vitamins etc. in the diet is discussed. The current trend towards increased consumption of European lager-type beer in Kenya is considered; disadvantages include the need for imported equipment and raw materials, the higher cost and lower nutrient content of lager beers, and adverse effects on the native culture. Advantages of a lactic fermentation stage in beer brewing are briefly discussed. AJDW

186

Comparison of several culture media and of some growth factors for detection of lactic acid bacteria.
Wackerbauer, K.; Kirchner, G.; Matsuzawa, K.; Greif, H.
Monatsschrift für Brauerei 34 (5) 132, 134–138, 140–142, 144–147 (1981) [19 ref. En, de]

Comparative studies were conducted to evaluate 11 media for detn. of lactic acid bacteria in beer. Growth of 7 strains of *Lactobacillus* and 5 of *Pediococcus* was evaluated, and selectivity against yeasts, wort bacteria, *Escherichia coli* and *Enterobacter aerogenes* was determined. Growth rate of lactic acid bacteria was greatest on Raka-Ray, MRS and LS media; VLB S7 was the most selective medium. Further trials were conducted to evaluate effects of pH and various additives (beer, sugars, amino acids, ML, peptones, betaine hydrochloride, diammonium citrate, *N*-acetylglucosamine, Tween 80) on growth of lactobacilli on VLB S7 medium. Most of these additives had little effect; methionine and histidine stimulated growth of lactic acid bacteria. The pH of S7 medium was a good compromise. Comparison of 8 liquid media showed rapid growth but poor selectivity. AJDW

187

Immobilization of *Leuconostoc oenos* cells for wine deacidification.
Lee, S. O.; Pack, M. Y.
Korean Journal of Food Science and Technology 12 (4) 299–304 (1980) [24 ref. En, ko] [Dep. of Biol. Sci. & Eng., Korea Advanced Inst. of Sci., Seoul 131, S. Korea]

L. oenos ML-34 cells were immobilized in a polyacrylamide gel and activated for malate decomposition by incubation at 50°C for 30 min in 15mM malate solution. Malate-decomposing activity was measured, and the immobilized cells were found to possess the same malo-lactic fermentation ability as free cells, but immobilization retarded the reaction. Immobilized and free cells were used to deacidify fermented sulphited wine or untreated grape juices (prior to fermentation). Cells had little effect on fermented sulphited liquor, but reduced, L-malic acid in grape juice to <50% of the original level within 12 h. By adjusting amounts of immobilized cells in the gel, and the incubation time, desired levels of acid may be maintained in wines from treated grape juices. LH

188

Associative growth of lactic acid bacteria in cabbage juice.
Yildiz, F.; Westhoff, D.
Journal of Food Science 46 (3) 962–963 (1981) [7 ref. En] [Dep. of Dairy Sci., Univ. of Maryland, College Park, Maryland 20742, USA]

Combinations of *Leuconostoc mesenteroides, Lactobacillus brevis, Pediococcus cerevisiae,* and *Lactobacillus plantarum* were grown in sterile cabbage juice broth. The effects of culture interactions were determined by lag times, generation times, pH change, and total acidity measurements. Fresh filter-sterilized cabbage juice was a better medium than autoclaved cabbage juice, or refigerated filter-sterilized cabbage juice. The addition of NaCl (2.25%) had a min. effect on the cultures, except for *L. mesenteroides,* which was inhibited. In paired association studies, *L. mesenteroides* was inhibited by all the other cultures; conversely, *L. plantarum* and *L. brevis* benefited from most of the culture interactions. IFT

189

Natural lactic acid fermentation of corn meal.
Fields, M. L.; Hamad, A. M.; Smith, D. K.
Journal of Food Science 46 (3) 900–902 (1981) [10 ref. En] [Dep. of Food Sci. & Nutr., Coll. of Agric., Univ. of Missouri, Columbia, Missouri 65211, USA]

A natural lactic acid fermentation occurs when water is mixed with corn meal and incubated at 37°C. *Lactobacillus fermentum, L. cellobiosus* and *Pediococcus acidilactici* were isolated; viable coliforms, yeast and moulds disappeared from the fermentation by the second day. Lactic acid bacteria predominated during the 4 days of study of the fermentation. Eh decreased during the first 24-h, which corresponded to the time coliforms were present in the fermenting corn meal. The percent yield of dry solids was related to the amount of water present. With less water, higher levels of acid were present inhibiting the flora which prevented less breakdown of the substrate and hence higher yields were obtained. IFT

190

[Effect of lactic starter on changes in proteins during doughmaking.]
El'tsova, O. P.; Roiter, I. M.; Vitavskaya, A. V.; Alekseeva, N. N.; Zainullina, G. Kh.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 1, 29–31 (1979) [8 ref. Ru] [Kievskii Tekh. Inst. Pishchevoi Promyshlennosti, Kiev, USSR]

The effect of starter containing *Lactobacillus fermenti*-27 on the nature of changes of proteins during doughmaking was studied. The named culture does not produce intensive proteolysis of proteins, but it promotes swelling and peptidization of N, together with the formation of soluble forms, important technologically. When heterofermentation (lactic and alcoholic fermentation) takes place, peptidization and protein macromolecule hydrolysis are accompanied by the formation of protein aggregates with low molecular wt.; N is consumed by yeasts in this process. STI

191

[Vital functions of lactic acid bacteria cultures in milk with different solids contents.]
Pulay, G.; Krasz, A.
Tejipar 29 (3) 49–60 (1980) [8 ref. Hu, en, ru] [Tejgazdasagtani es Mikrobiol. Tanszek, Agrartudomanyi Egyetem, Mosonmagyarovar, Hungary]

Effects of the TS and SNF content of milk on the acid production of the following cultures at different temp. and inoculation levels were determined: $FD_1 + Pr_7$ butter starter; *Streptococcus lactis* L645; *Lactobacillus casei*; and *Str. thermophilus* and *L. bulgaricus* (in isolation and in combination as a yoghurt culture). The relationship of TS content to other factors affecting culture activity (water activity, pH and non-dissociated lactic acid content of the medium) was also studied. Results are presented in graphs and tables. The study, in which milk with TS contents up to about 45% was used, was carried out in view of the increasing tendency in Hungary to make cheese and other cultured products from conc. milk. ADL

192

Intravitam investigation of growth of Armenian yogurt microflora.
Erzinkyan, L. A.; Shadrina, I. A.; Mashkovtseva, A. V.; Akopova, A. B.
Microbiology 49 (1) 128–132 (1980) [5 ref. En]

Changes in morphology of *Lactobacillus jugurt* and *Streptococcus thermophilus* during growth (intra vitam studies) in skim milk under optimum conditions were observed microscopically. The lactobacilli appeared as rods of various lengths, chains of short rods and branching rods after 18–20 h, and became progressively elongated, with a tendency to coil into complex knots and helices after 3–4 days; the number of live cells then

decreased significantly and there was no further increase in acidity. The streptococci were nearly all diplococci in short chains in the 18–20 h culture; chains gradually elongated and enlarged, heteromorphous angular cell forms appeared, and as acidity increased to 136°T at the end of day 2, the cocci aggregated and pronounced zones of lysis appeared. Extensive polymorphism was evident after 4–5 days, and live cell counts decreased markedly. CDP

193

[Use of pure cultures in cheese manufacture.]
Minarik, R.
Prumysl Potravin 32 (4) 208–211 (1981) [Cs]
[Vyzkumny Ustav Mlekarensky, Tabor, Czechoslovakia.]

Characteristics and role of various lactic acid bacteria in the ripening of cheese and their effects on the quality of the final product are discussed in this review-type article. Increasing use of *Lactobacillus plantarum* in the USSR is due to its inhibitory effect on butyric acid bacteria; the organism also appears to prevent the development of bitter flavour. In the manufacture of Emmental cheese, use is made of 0.04–0.09% *L. helveticus*, 0.04–0.10% *Streptococcus thermophilus*, 0.02–0.04% *L. casei* and 0.4–0.5% cream culture plus about 2 ml propionic acid bacteria culture/1000 l milk. In the manufacture of Edam cheese the use of *L. casei* at about 0.02% in addition to cream culture improved protein breakdown, flavour and keeping quality, a strain isolated in Czechoslovakia giving the best results. FL

194

[New original pure cultures of lactic acid bacteria.]
Teply, M.
Prumysl Potravin 32 (2) 81–84 (1981) [7 ref. Cs]
[Vyvojovy Zavod Mlekarenskeho Prumyslu, Prague, Czechoslovakia]

New isolates of Czechoslovak dairy cultures used industrially for production of cream, yoghurt, Emmental cheese, acidophilus milk and production of nisin are described, together with their sources. In all 206 strains of lactic acid bacteria were obtained, mainly from grasses and milk in mountainous areas of Czechoslovakia. Some freshly isolated *Bacillus subtilis* strains have been suitably adapted and are being used in the manufacture of microbial rennets for use in cheesemaking. The new strains are employed mainly in the dairy industry but also in other branches of the food industry, such as in beet sugar manufacture. FL

195

Preparation of cheese with ropy lactic acid bacteria.
Pruss, H.-D.; Bahrs, L.-W. (Lever Brothers Co.)
United States Patent 4 243 684 (1981) [En]

The mealy and/or sandy texture occurring sometimes in soft cheese made from milk concentrated by membrane filtration is prevented by using ropy cultures of lactic acid bacteria (e.g. from Swedish sour milk "Langil") in place of non-ropy cultures for acidifying the milk. EJM

196

[Effect of the mesophilic lactic acid bacteria *Streptococcus cremoris, Streptococcus lactis, Streptococcus diacetilactis* and *Leuconostoc citrovorum* on characteristics of Minas-type cheese. Titratable acidity and pH.]
Bonassi, I. A.; Goldoni, J. S.; Gomes, M. C. G.
Revista do Instituto de Laticinios Candido Tostes 36 (214) 7–14 (1981) [14 ref. Pt, en] [Dep. de Tecnologia dos Produtos Agropecuarios, Fac. de Ciencias Agron., Univ. Estadual Paulista "Julio de Mesquita Filho", Botucatu, SP, Brazil]

In 5 experiments, Minas cheese was made with 16 combinations of *Streptococcus lactis, S. lactis* subsp. *diacetylactis, S. cremoris* and *Leuconostoc cremoris*. Titratable acidity (as lactic acid) after 3–30 days was 0.87–1.31 g/100 g cheese and 1.49–2.13 g/100 g DM. The pH was 4.72–4.96. Acidity was lower in control cheeses made without lactic acid bacteria. There were no marked differences in pH or titratable acidity between cheeses made with different combinations of bacteria, although acidity tended to be slightly higher if combinations with high proportions of *S. cremoris* were used. In all cheeses the acidity was high initially, then decreased between the 5th and 20th day of ripening, and finally increased again slightly between the 20th and 30th day. ADL

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FAB 31

LACTIC ACID BACTERIA IN BEVERAGES AND FOOD

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H. BROOKES

EDITOR

1

[Stabilization of mayonnaise and related products.]
Casolari, A.; Vignoli, L.; Rossi, M. C.; Manganelli, E.
Industria Conserve 55 (2) 97–102 (1980) [12 ref. It, en]
[Sta. Sperimentale per l'Ind. delle Conserve Alimentari, Parma, Italy]

The sensitivity of some strains of yeast *(Cladosporium, Rhodotorula, Torulopsis, Sporobolomyces, Hansenula)* and *Lactobacillus (brevis, casei* and *arabinosus)* to acetic, lactic, citric and hydrochloric acids was determined in media with and without added NaCl. The same organisms were then inoculated into emulsified egg yolk sauces (mayonnaise) containing 40–80% peanut oil and, for each oil level tested, different amounts of NaCl and organic acids. Results, shown graphically and in tables, revealed that inhibition of yeasts by acetic acid and of lactobacilli by citric acid and NaCl extended shelf-life at 25°C to 3 months. Amounts of added chemicals varied with the oil content e.g. ≥0.5% acetic acid of the aqueous phase (0.15 g/100 g of emulsion) + ≥1.21% citric acid of the aqueous phase were required for microbial stabilization of 65–80% oil emulsions, the same concn. of acetic acid + 0.6–0.9% citric acid (or a single acid with appropriate NaCl addition) to stabilize 40% oil emulsion. While some yeasts were able to tolerate up to 3% acetic acid, combined use with citric acid and NaCl was able to stabilize the product. RM

2

Growth characteristics, bile sensitivity, and freeze damage in colonial variants of *Lactobacillus acidophilus.*
Klaenhammer, T. R.; Kleeman, E. G.
Applied and Environmental Microbiology 41 (6) 1461–1467 (1981) [26 ref. En] [Dep. Food Sci., North Carolina State Univ., Raleigh, North Carolina 27650, USA]

This report describes the isolation of stable R (rough) and S (smooth) types from a heterogeneous culture of *L. acidophilus* RL8K, their growth characteristics in commercial MRS broth, and the response of each type to bile salts and frozen storage conditions that are important in the selection of *Lactobacillus* strains for use in frozen concentrated cultures and dietary adjuncts. AL

3

[Effect of enzymic hydrolysates on accumulation of *Bifidobacterium* biomass.]
Ervol'der, T. M.; Gudkov, A. V.; Semenova, L. P.; Goncharova, G. I.
Molochnaya Promyshlennost' No. 12, 15–17, 46 (1980) [9 ref. Ru] [Nauchno-Proizvodstvennoe Ob'edinenie 'Uglich', Uglich, USSR]

To simplify the composition of media for culturing bifidobacteria, tests were carried out with skim milk treated for 1–3 h at 55–57°C with pancreatin or with PS preparation of neutral microbial proteinases, or at 35–37°C with pepsin or chymosin. Components of the modified Blaurock medium (peptone 1, lactose 1, NaCl 0.5, cysteine 0.1, agar 0.075, and liver broth to 100%) less liver broth and peptone were added to the different hydrolysates. Contents of peptide and amino N are tabulated in comparison with those of the control liver broth medium. Each medium was inoculated with 5% of a 48-h culture of a strain of bifidobacteria isolated from the faeces of a suckling infant and incubated at 37.5°C for 48 h. Numbers of colony-forming units were 5×10^8 for the control (0.101% peptide N and 0.093% amino N); and best results for the experimental media were for that containing milk hydrolysed for 3 h with pancreatin (0.092% peptide N and 0.020% amino N) and that containing milk hydrolysed for 3 h with PS preparation (0.099% peptide N and 0.035% amino N), numbers being 3×10^8 and 4×10^8 resp. The pancreatin and PS media are recommended to replace the liver broth medium as they make possible omission of components that are expensive and scarce in the USSR, PS medium being given preference because its pH optimum is near the natural pH of milk. SKK

4

[Use of a turbidimetric method in production of bacterial concentrate.]
Priidak, T. A.; Bannikova, L. A.
Molochnaya Promyshlennost' No. 12, 22–23, 46 (1980) [3 ref. Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Calibration curves relating optical density of bacterial suspensions to numbers of viable cells in the exponential phase of growth were constructed for mesophilic and thermophilic lactic streptococci; cultures were incubated for 12 h at 30 or 40°C resp. in a medium of deproteinized tvorog whey diluted with water and supplemented with maize extract and sodium citrate. Optical density was measured turbidimetrically, and numbers of viable cells calculated by a cup method. Industrial starters, with high acidifying activity and good organoleptic characteristics, consisting of multi-strain starters of *Streptococcus lactis, S. cremoris* and *S. acetoinicus,* 3-strain starters of the same species, 2-strain starters of *S. lactis* and *S. acetoinicus,* and 45 *S. thermophilus* starters (total 183 different starters) were grown for 8 h in the stated medium, and numbers of cells in the medium were measured using the calibration curves. Proportions of high-cell-yielding starters ($2–4 \times 10^9$ cells/ml) were 25–50%. It is concluded that lactic acid bacteria intended for production of concentrates must be selected not only on acidifying capacity and aroma formation, but also on cell yield. SKK

5

[Formation of acetic acid by lactic acid bacteria.]
Lafon-Lafourcade, S.; Lucmaret, V.; Joyeux, A.
Connaissance de la Vigne et du Vin 14 (3) 183–194 (1980) [6 ref. Fr, en, de, es, it] [Inst. d'Oenologie, Univ. de Bordeaux II, 351 Cours de la Liberation, 33405 Talence Cedex, France]

In a series of tests, must of grapes or of synthetic origin (Carr's medium), at pH 3.5, were used for anaerobic lactic acid fermentations, using *Leuconostoc oinos* as test organism, to study bacterial development, degradation of substrates and formation of acetic acid after 2–60 days. Results (tabulated) showed that the initial sugar concn. had little effect on the proportion of sugar degraded; that citric and malic acids, both activators, were degraded by the 5th day in all cases; that glycerol (10 g/l) functioned as an activator; and that

tartaric acid inhibited growth and fermentation activity. Bacterial metabolism was much affected both by composition of medium and phase of bacterial growth: during the growth period little acetic acid was formed, but more was released during the lag periods. Presence of malic acid in wine indicated a bacterial population incapable of producing excessive quantities of acetic acid. KME

6

[Accumulation of acids in lactic acid starter during accelerated dough development.]
Sverdlova, L. P.; Beganskaya, L. S.
Khlebopekarnaya i Konditerskaya Promyshlennost'
No. 12, 19–20 (1979) [Ru] [Vses. Nauchno-issled. Inst. Khlebopekarnoi Promyshlennosti, USSR]

Grade I wheat flour, water and a pure culture of a special strain of lactic acid bacteria were used to prepare conc. starter with lactic acid bacteria (CSLB). High-quality bakery products were obtained using CSLB with a titratable acidity of 16–18° and a pH of 3.59–3.52. Due to acid accumulation, the acidity in the starter rose during preparation, necessitating control of the acidity of the finished starter by addition of kitchen salt. The optimum amount of NaCl was determined from the difference between titratable and active acidity, and the content of lactic acid bacteria/g starter. Addition of 8% NaCl practically stopped bacterial growth; thus, the acidity of the finished CSLB could be kept constant. STI

7

[Stability of freeze-dried mesothermophilic lactic acid bacteria cultures.] Untersuchungen zur Stabilität lyophilisierter mesothermophiler Milchsäurebakterienkulturen.
Zickrick, K.; Rudolf, G.; Kunz, B.
Milchforschung-Milchpraxis 23 (2) 44–45 (1981) [De] [Bereich Mikrobiol., Sektion Nahrungsgüterwirtschaft & Lebensmitteltech., Humboldt-Univ., Berlin]

VEB Ostra, Dresden, German Democratic Republic, has been producing single-strain and multiple-strain cultures in freeze-dried form for some years. Effects of freeze-drying on bacterial activity were studied by comparing bacterial counts in liquid cultures and freeze-dried cultures after incubation and calculating the survival rate, i.e. count in the freeze-dried culture as % of the count in the liquid culture. Survival rates for single-strain cultures ranged from 42.1% for *Streptococcus lactis* subsp. *diacetylactis* to 96.2% for *S. lactis*, with intermediate values of 52.9% for *S. cremoris* and 73.8% for *Leuconostoc cremoris*. Survival rates for multiple-strain cultures ranged from 28.1% for *S. cremoris* + *S. lactis* subsp. *diacetylactis* to 75% for *S. lactis* + *S. lactis* subsp. *diacetylactis*. In multiple-strain cultures, freeze-drying tended to reduce the proportions of *S. lactis* subsp. *diacetylactis* and *S. cremoris* but increase the proportion of *L. cremoris*. [References available from publishers.] ADL

8

[Proteolysis of milk with microorganisms immobilized on agar gel: effect on some lactic acid cultures (*Lactobacillus bulgaricus, Streptococcus thermophilus*).]
Costamagna, L.
Scienza e Tecnica Lattiero-Casearia 32 (1) 41–49 (1981) [30 ref. It, en] [Istituto di Microbiol. Lattiero Casearia, Univ., Perugia, Italy]

Milk was given proteolytic treatment for 15 min at 60°C with *Bacillus subtilis* or *Pseudomonas* spp. cells immobilized on agar gel. Growth and acid production of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* strains, singly and especially in association, were much better in this milk than in untreated milk. Untreated milk, milk treated with *B. subtilis* and milk treated with *Pseudomonas* spp., resp., contained 0.41, 0.46 and 0.45 g total N/100 ml, with 0.304, 0.296 and 0.336 g casein N, 0.028, 0.054 and 0.0365 g non-protein N, and 0.027, 0.061 and 0.0355 g proteose-peptone N. Treatment with *Pseudomonas* spp. produced a much greater increase in free amino acids (especially leucine, lysine, isoleucine, valine and phenylalanine) than treatment with *B. subtilis*. ADL

9

Characteristics of mixed-strain starters of *Streptococcus cremoris* and *Leuconostoc cremoris*.
Libudzisz, Z.; Pajek-Bilska, J.
Acta Alimentaria Polonica 6 (4) 259–267 (1980) [21 ref. En, pl] [Dep. of Tech. of Fermentation & Microbiol., Tech. Univ., Lodz, Poland]

Streptococcus cremoris 329 and *Leuconostoc cremoris* 1388 resp., when grown separately, had a mean generation time of 1.33 and 2.4 h in milk, with log growth phase beginning after 4 and 5–6 h and lasting for 16 and 19–22 h; max. count reached was 6.5×10^9 and 2.3×10^9 colony-forming units (cfu)/ml. *Str. cremoris* produced more acid (1–1.15% vs. 0.6–0.7% lactic acid) than *Leuc. cremoris*, and acetaldehyde production increased steadily to 7.9 mg/l after 48 h with *Str. cremoris* but reached a peak of 4 mg/l after about 24 h with *Leuc. cremoris*. Acetoin and diacetyl were produced only by *Leuc. cremoris*, max. levels of 2.46 mg diacetyl/l after 28 h and 99.6 mg acetoin/l after 36–38 h being recorded. By using a mixed culture of 1:10 *Str. cremoris/Leuc. cremoris*, max. count of *Leuc. cremoris* increased to 4×10^9 cfu/ml and generation time decreased to 2–3 h, acid production increased from 0.87 to 1.05 g/100 ml milk and diacetyl and acetoin production decreased by nearly 50%. The *Leuc. cremoris* utilized the acetaldehyde and lowered its level by 30–50%. CDP

10

Biochemistry and genetics of citrate utilization in *Streptococcus lactis* spp. *diacetylactis*.
Kempler, G. M.; McKay, L. L.
Journal of Dairy Science 64 (7) 1527–1539 (1981) [46 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St Paul, Minnesota 55108, USA]

11

Effects of temperature on the interaction of phage ml8(1) and *Streptococcus lactis* ML8.
Mullan, W. M. A.; Daly, C.; Fox, P. F.
Milchwissenschaft 36 (5) 288-290 (1981) [11 ref. En, de] [Dep. of Dairy & Food Microbiol., Univ. Coll., Cork, Irish Republic]

Phage ml8(1) caused mass lysis of *Str. lactis* ML8 at 30°C, but failed to replicate at 38°C although good host growth occurred at up to 40°C. Preliminary experiments established that it was a phage function which was heat-sensitive. Phage ml8(1) was not inactivated at 38°C and adsorption was not significantly altered at this temp. The use of modified one step growth experiments, in which phage-bacterium complexes were transferred from 30 to 38°C, revealed that almost all the stages in intracellular phage development at 30°C were inhibited at 38°C. Experiments with other phages, which did not replicate at temp. permitting host growth, revealed that they were also temp. sensitive (ts). Three groups of ts phages were found based on whether phage development occurred at 34-36°, 36-38°, or 38-40°C. The use of phage heat sensitivity in phage classification and the contribution that ts phages make to starter genetics are discussed. AS

12

Increased formation of carbonyl compounds of milk fat by mutants of lactic acid bacteria.
Jasjit Singh; Chander, H.; Ranganathan, B.
Milchwissenschaft 36 (5) 266 (1981) [7 ref. En, de] [Div. of Dairy Bact., Nat. Dairy Res. Inst., Karnal, India]

4 mutants, obtained by UV irradiation of *Streptococcus lactis* subsp. *diacetylactis*, and 1 mutant each of *Lactobacillus casei* and *L. bulgaricus* (obtained by γ-irradiation) were examined for carbonyl production after incubation at 37°C for 48 h in cows' milk. Total carbonyls produced by each of the 4 *S. lactis* mutants were 24.7, 25.7, 31.4 and 46.2 μmol/g fat vs. 24.1 μmol/g fat for the parent strain. Total carbonyl production by the parent and mutant lactobacillus strains was resp. 14.8 and 19.9 μmol/g fat for *L. casei* and 15.1 and 22.8 μmol/g fat for *L. bulgaricus*. The mutants giving high carbonyl production may be useful for improving the flavour of cultured milk products. MEG

13

[New trends in butter technology.]
Krcal, Z.
Prumysl Potravin 32 (4) 206-207 (1981) [Cs] [Vyskumny Ustav Mliekarensky, Zilina, Czechoslovakia]

A new type of butter in experimental production in Slovakia since the end of 1980 is made by working a cream culture into sweet cream butter. The product has an improved, more pronounced aroma and longer storage life than sweet-cream butter, due to the protective effect of the lactic acid. This was demonstrated in storage trials in which the butter, even after several months of storage at +5 to −18°C exhibited very small changes in the contents of free fatty acids, peroxides and carbonyl compounds. FL

14

[Effect of copper ions on the development of lactic acid and butyric acid bacteria in small rennet cheeses.]
Gudkov, A. V.; Perfil'ev, G. D.; Prigorov, N. I.; Gudkov, S. A.
Molochnaya Promyshlennost' No. 4, 23-25 (1981) [6 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

The possibility of selectively suppressing butyric acid bacteria in cheese by increasing the Cu content of the cheese milk by addition of $CuSO_4$ at 0.5-2.6 mg Cu ions/l was studied. When added at 0.50-0.65 mg/l it reduced the growth of vegetative clostridia cells to 7.5 fold level in c heese after pressing, compared with 200-fold increase in control cheese without added Cu, whilst at 1.0-1.5 mg/l it completely inhibited the development of butyric acid bacteria during pressing and in the finished cheese. At concn. of up to 1.5 mg/l, Cu did not show any appreciable effects on the technological process, growth of lactic acid bacteria, utilization of lactose or pattern of protein breakdown, and it improved organoleptic properties of the cheese (additions of 1.0-1.5 mg/l being optimal). Increasing the dose to 2.6 mg/l had adverse effects on the characteristics studied and the finished product had an excessively acid taste and bitter flavour. FL

15

Selection and characterization of strains and cultures to be used in preparing dried and frozen lactic bacterial concentrates.
Fesnak, D.; Rymaszewski, J.; Kornacki, K.; Kramkowska, A.
Acta Alimentaria Polonica 6 (4) 269-280 (1980) [27 ref. En, pl] [Production Lab. of Dairy Biopreparations, Cent. Admin. of Dairy Ind., Olsztyn, Poland]

17 *Streptococcus lactis*, 27 *Str. lactis* subsp. *diacetylactis*, 19 *Str. cremoris* and 5 *Leuconostoc cremoris* strains were evaluated, and certain strains were selected on the basis of fermentation and proteolytic activities, production of flavour compounds, resistance to antibiotics and bacteriophage, and lysogenic properties. The selected strains, which had high acid-producing activity and (for butter starters) produced diacetyl and acetoin in milk, were used to prepare 4 sets each of cheese and butter mixed-strain starters; *Lactobacillus casei* strain 2 or 'Paris' strain was included in each cheese starter. The ultimate criterion when selecting strains for concentrate production was the final cell yield and activity of the concentrate. CDP

16

Carbohydrate fermentation by *Streptococcus cremoris* and *Streptococcus lactis* growing in agar gels.
Thomas, T. D.; Turner, K. W.
Applied and Environmental Microbiology 41 (6) 1289-1294 (1981) [22 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

Glucose fermentation by 4 strains of *Streptococcus cremoris*, 4 of *S. lactis* and 1 of *S. lactis* subsp. *diacetylactis* was studied in agar gels, since this more closely resembles the conditions in cheese curd than

does a liquid culture medium. High colony densities gave exponential glucose utilization and homolactic fermentation, whereas with a low colony density, formation of formate, ethanol and acetate occurred with 9 of the 10 strains examined. *S. lactis* ML8 remained homolactic when grown at low colony density in agar. The change from homo- to heterolactic fermentation appeared to be caused by carbohydrate depletion in the vicinity of the colony. When strains were grown on the surface of the agar under anaerobic conditions, glucose and lactose were fermented to lactate; under aerobic conditions all 8 strains of *S. lactis* tested were heterolactic, but 6 of 12 *S. cremoris* strains remained homolactic. Results are discussed in terms of lactose fermentation during cheese ripening. MEG

17

Acceleration of cheese ripening by the addition of whole cells or cell free extracts from *Lactobacillus casei* to the cheese curd.
El-Soda, M.; Desmazeaud, M. J.; Abou-Donia, S.; Kamal, N.
Milchwissenschaft 36 (3) 140–142 (1981) [13 ref. En, de] [Dep. of Agric. Ind., Alexandria Univ., Alexandria, Egypt]

Cheddar cheese was manufactured by the traditional method except that after milling and during salting the curd was divided into 3 portions: *Lactobacillus casei* cells (1.7×10^5/g curd) were added t o 1 portion, an equivalent amount of *L. casei* cell-free extract to a 2nd portion and an equivalent amount of buffer solution was added to the 3rd (control) portion. Curds were packed in polyethylene bags and sampled at 15 day intervals during ripening for 3 months. The general composition (pH, contents of DM, fat and total protein) of the 3 curds were similar, but ripening index (from formol number, volatile acidity and soluble N content) was higher in curd with added cell-free extract than in curd with added whole cells; the control curd showed the lowest ripening index. Although the cell-free extract accelerated cheese ripening, it also resulted in development of a bitter flavour in the cheese. MEG

18

[Characteristics and evaluation of the technological application of a thermo-bacteriological pasteurization test to canned meats. I. Decimal reduction times and coefficients of the pasteurization effect.] Charakteristik und Bewertung der technologischen Verwendbarkeit thermo-bakteriologischer Pasteurisierungstests von Fleischkonserven. I. Dezimale Reduktionszeiten und Koeffizienten der Pasteurisierungseffekte.
Wojciechowski, J.
Fleischwirtschaft 60 (9) 1726–1731 (1980) [many ref. De, en] [Agric. Akad. Poznan, Wojska Polskiego 31, 60-624 Poznan, Poland]

The utilization of selected streptococci (*Streptococcus faecium* 1861 and *Str. faecalis* 509) as test strains for evaluating the pasteurization of canned meat was investigated. Results, shown graphically and in a table, revealed that decimal reduction times for *Str. faecium* 1861 in canned ham at 60° to 95°C were 2–5 min, and the coeff. of the pasteurization effect 42°C. Decimal reduction times of *Str. faecalis* 509 and *Str. faecium* 1861 in cured meat at 60° to 75°C were 55.3–23.5 and 64.9–28.8 min resp., with the greatest reduction between 60° and 70°C (55.3–31.2 and 64.9–37.8 min resp.). RM

19

Effect of cultural conditions and media on the antimicrobial activity of *Streptococcus thermophilus*.
Rao, D. R.; Pulusani, S. R.
Journal of Food Science 46 (2) 630–632 (1981) [15 ref. En] [Dep. of Food Sci. & Tech., Alabama Agric. & Mech. Univ., Normal, Alabama 35762, USA]

When *Streptococcus thermophilus* was grown in basal medium with or without fermentable carbohydrate (lactose, glucose or sucrose at 2% level), antimicrobial activity was detected only in the cell-free medium, and cells were free of any antimicrobial activity. Peanut milk, soymilk and basal medium with a fermentable sugar supported the production of antimicrobial compound(s) by *S. thermophilus*. Milk-based medium did not appear to be a necessity for such activity. When tested independently, the optimum temp. for max. production of antimicrobial activity by *S. thermophilus* in whole milk was 50°C, while the optimum time of incubation was 48 h. An initial pH of 6.0 resulted in max. antimicrobial activity in basal medium with 2% lactose. IFT

20

[Studies on decomposition of gluconic acid by yeasts and lactic acid bacteria.] Versuche zum Abbau der Gluconsäure durch Hefen und Milchsäurebakterien.
Holbach, B.; Woller, R.
Weinwirtschaft 117 (12) 342, 344–345 (1981) [5 ref. De] [Chem. Untersuchungsamt, Trier, Federal Republic of Germany]

Studies were conducted to evaluate decomposition of gluconic acid in musts. A 1979 Bereich Obermosel Elbling must was supplement with gluconic acid to a concn. of 0.41 g/l, then fermented: analyses during fermentation showed gluconic acid concn. to decrease to 0.33–0.34, after which it remained constant. Saponification restored gluconic acid concn. to approx. the initial value, indicating that the decrease in gluconic acid concn. is due to esterification. Trials were conducted on non-sulphited wine in 10 000 l tanks or 1000-l casks, to evaluate capacity of *Lactobacillus brevis* strain B31 (previously cultured on a grape juice/wine medium) to decompose gluconic acid. The results show no gluconic acid degradation by *L. brevis* in the 10 000 l tanks, and only slight decomposition in the 1000 l tank. *L. brevis* did, however, cause considerable decomposition of malic and citric acids. Hot saponification may give inaccurate results in analysis for gluconic acid, as it may lead to gluconic acid formation by degradation of glucose or fructose. It is suggested that wines containing residual sugar should be cold-saponified with KOH or NaOH at pH 10 before analysis for gluconic acid. AJDW

21

Beer wort beverage.
Asahi Breweries KK
UK Patent Application 2 057 846A (1981) [En]

Beer wort is fermented with lactic acid bacteria to convert it into a refreshing, clean tasting beverage having a beer-like colour and containing practically all the nutritious components of the original wort. IFT

22

Chemical changes in tomato juices caused by lactic acid bacteria.

Juven, B. J.; Weisslowicz, H.

Journal of Food Science 46 (5) 1543–1545 (1981) [En] [Div. of Food Tech., Agric. Res. Organization, Volcani Cent., PO Box 6, Bet Dagan 50-250, Israel]

In an attempt to use specific bacterial metabolites in a monitoring system to detect initial signs of spoilage of tomato products, the changes in bacterial counts, pH, titratable acidity and the accumulation of lactic acid, hydrogen peroxide, diacetyl (DA) and acetoin (AMC) in tomato juices inoculated with *Lactobacillus plantarum, L. fermentum* and *Leuconostoc mesenteroides,* were studied. Of the metabolites tested, it appeared that DA and AMC could be taken as valuable indicators of contamination of tomato juice by lactic acid bacteria at early stages, but not at advanced stages of bacterial growth. IFT

23

Microbial changes in sweet sorghum *(Sorghum bicolor)* juices.

Daeschel, M. A.; Mundt, J. O.; McCarty, I. E.

Applied and Environmental Microbiology 42 (2) 381–382 (1981) [7 ref. En] [Dep. of Microbiol., Univ. of Tennessee, Knoxville, Tennessee 37916, USA]

Juice freshly expressed from *Sorghum bicolor* for making sweet sorghum syrup contained 10^8 microorganisms/ml. The dominant bacterium was *Leuconostoc mesenteroides,* followed by gram-negative rods. Lactobacilli, yeasts, and nonfaecal coliform bacteria each comprised about 1% of the microbial population. Spoilage of juice, manifested by a sour odour, discoloration, and foaming, occurred between 5 and 12 h at ambient temp. Spoilage was correlated with a drop in pH from 4.9 to 4.5. *L. mesenteroides* was the dominant spoiling agent at 20°C, and *Lactobacillus plantarum* was the dominant spoiling agent at 32°C, as determined by pure culture studies. Juice may be stored for 14 days at 4°C if promptly refrigerated. AS

24

[Accelerated manufacture of bread roll products.]

Kurilova, E. P.; Umirzakova, S. Kh.; Raikh, L. A.

Khlebopekarnaya i Konditerskaya Promyshlennost' No. 8, 21 (1980) [Ru] [Dzhambulskoe Proizvodstvennoe Ob"edinenie Khlebopekarnoi Promyshlennosti, Dzhambul, USSR]

The process comprises addition of starter with an enzyme preparation, consisting of flour and water (1:2), *Lactobacillus delbrückii* and Amylorizin P10x, and saccharification and fermentation for 2–2.5 h at 50–52°C. The experimental dough was made as described in recipes with 15% starter (in terms of flour wt.), starter acidity 3–4°. Moisture content of the experimental and control dough was 31%, acidity 2.5–2.6°, adjusted to 3–3.2° after 40–60 min fermentation. The physico-chemical and organoleptic properties and the shelf life of the experimental bread roll products were better than those of the controls, showing that the straight process with Amylorizin P10x is suitable for manufacture of bread roll products. STI

25

Mode of action of diplococcin, a bacteriocin from *Streptococcus cremoris* 346.

Davey, G. P.

New Zealand Journal of Dairy Science and Technology 16 (2) 187–190 (1981) [15 ref. En] [New Zealand Dairy Res. Inst., Palmerston North, New Zealand]

26

Natural growth factors for *Lactobacillus bulgaricus* AU.

Tiwari, K. P.; Pandey, A.

Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene, II 136 (3) 263–265 (1981) [12 ref. En, de] [Dep. of Chem., Univ. of Allahabad, Allahabad, India]

Effect of aqueous extracts of amla fruit (*Emblica officinalis*), imali fruit (*Tamarindus indica*), podina whole plants (*Mentha arvensis*) and shaljam roots (*Brassica tapa*) on growth of *Lactobacillus bulgaricus* AU in 20% molasses was studied. After 6 days incubation at 47°C, with the pH of the medium maintained at 5.8–6.0 by gradual addition of $CaCO_3$, the culture medium was analysed for lactic acid content and unfermented sugar. Extracts of amla and imali fruits stimulated lactic acid production by *L. bulgaricus,* whereas the podina plant extract had no effect and the shaljam extract inhibited lactic acid production. MEG

27

[Investigations in the incidence of temperate group N streptococcal phages in cheese whey.]

Untersuchungen zur Anwesenheit von temperenten N-Streptokokkenphagen in Käsemolke.

Kirchhübel, W.

Nahrung 25 (1) 82–90 (1981) [15 ref. De, en, ru] [Inst. für Milchwirtschaft, DDR-1400 Oranienburg, German Democratic Republic]

32 strains of *Streptococcus lactis* subsp. *diacetylactis,* 19 of *Str. lactis,* and 1 of *Str. cremoris* were isolated from 7 samples of whey from 6 soft-cheese factories. Temperate phages were detected in all strains by a treble closing procedure described in detail. 44 (85%) of the strains were lysed by the temperate phages; and 16 of 22 strains tested were lysed by temperate phages from the same sample. Only a small number of temperate phages could be obtained in pure culture because of the lysogenic tendency of the strains of group N-streptococci. The bearing of the findings an cheesemaking practice is discussed. SKK

28

[Relationship between streptococci and lactobacilli during ripening of Fontina cheese.]

Parisi, E.; Gobetto, M.; Julini, M.

Annali della Facolta di Medicina Veterinaria di Torino 26, 41–49 (1979) [11 ref. It, fr, en] [Istituto di Ispezione degli Alimenti di Origine Anim., Univ., Turin, Italy]

Lactobacilli were counted, on MRS agar and on Rogosa agar, and group D streptococci on Difco Enterococcus and on bile/aesculin/azide agars, in samples taken during the manufacture and ripening of commercial Fontina cheese. The fresh curd contained lactobacilli and group D streptococci each at about 10^7/g. Lactobacilli and group D streptococci increased initially and were max. during the 2nd and 1st month of ripening resp., decreasing by the 5th month to $> 10^7$ and $< 10^6$/g, resp. for winter cheese, and to $> 10^6$ and

29

[Effect of lactose hydrolysis on activity of lactic acid bacteria.]
Khamagaeva, I. S.; Tikhomirova, A. S.; Kulikova, A. K.
Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 6, 133–134 (1980)
[3 ref. Ru] [Vostochno-sibirskii Tekh. Inst., USSR]

The effect of enzymic hydrolysis of lactose in milk on acid formation and rate of growth of lactic acid bacteria was studied. Yeast β-galactosidase with the activity of 1200 units/g was used. Enzymic hydrolysis increased the acid production of lactic acid bacteria, and their rate of growth, especially with the aroma-forming bacteria. STI

30

[Bacterial starter for cheese with cheddarization and melting of cheese material.]
Ramazanov, I. U.; Ramazanova, O. P.; Vdovichenko, O. V.; Kaplenko, N. N. **(Union of Soviet Socialist Republics,** Severo-Kavkazskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti)
USSR Patent 784 853 (1980) [Ru]

A starter for use in the manufacture of plasticized cheeses, such as Suluguni, Arman, Kachkaval and Sloistyi, comprises mesophilic streptococci (*Str. lactis, Str. cremoris*), thermophilic streptococci (*Str. thermophilus*) and lactobacilli (*Lactobacillus lactis*). To accelerate the ripening of the cheeses in brine, use is made of special *Str. lactis* strains C253, 122, 234 and 237, *Str. cremoris* 912a and 136, which grow at salt concn. of 6.0–7.5%, *Str. thermophilus* 125 and *L. lactis* 13; the ratio between the mesophilic and thermophilic streptococci and lactobacilli is 2:1:1. Use of this starter improves the quality of the cheese. FL

31

[Heat inactivation of streptococcal bacteriophages in whey cream.]
Nebert, V. K.; Gudkov, A. V.; Dokukin, V. M.; Bondarenko, A. K.
Trudy, Vsesoyuznyi Nauchno issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 29, 7–9 (1979) [2 ref. Ru] [VNIISP, Uglich, USSR]

Samples of whey and whey cream obtained in the manufacture of Litovskii, Pribaltiiskii and Rossiiskii cheese at Uglich dairy plant were examined for concn. of bacteriophages, using 5 indicator strains of lactic streptococci (*Streptococcus lactis, S. lactis* subsp. *diacetylactis,* and *S. cremoris*). Max. concn. of bacteriophage particles in both the whey and whey cream was in the order of 10^7/ml, this level persisting in uncooled whey for 12 h at 15–20°C. The bacteriophage was completely inactivated by heating the cream (containing a max. of 10^8 particles/ml) at 90°C with 5 min holding. It is recommended that when using whey cream for standardizing cheese milk, the cream should be pasteurized at 90°C with 10 min holding or at 95°C with 5 min holding to ensure complete destruction of the phage. FL

32

[Acid whey for use in the production of milk protein products.]
Stepanova, L. I.; Kudryavtseva, T. A.
Molochnaya Promyshlennost' No. 4, 20–21 (1981)
[5 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, Leningrad, USSR]

The possibility of accelerating the fermentation to achieve high acidities in whey for use as a milk coagulant was studied using 2 lactobacilli and additions of disodium phosphate (at rates of 0.25–0.50%). Best results (acidities of about 255°T and lactic acid concn. of 2.36%) were obtained when fresh cheese whey was fermented with *Lactobacillus acidophilus* strain 336 or *L. bulgaricus* strain B-52 with the addition of 0.50% disodium phosphate over 48 h. Omission of the mineral addition substantially reduced acid production, and fermentation time was increased by >50%. FL

33

Effect of cheese-making temperatures on the interactions of lactic streptococci and their phages.
Mullan, W. M. A.; Daly, C.; Fox, P. F.
Journal of Dairy Research 48 (3) 465–471 (1981)
[23 ref. En] [Dep. of Dairy & Food Microbiol. & Chem., Univ. Coll., Cork, Irish Republic]

The interactions of 23 bacteriophages on strains of lactic streptococci [*Streptococcus lactis, S. cremoris* and *S. lactis* subsp. *diacetylactis*] at 30, 38 and 40°C were studied in reconstituted skim-milk and broth media. In milk, 3 different temp. mediated responses were observed. Extensive phage replication at 30, 38 and 40°C with inhibition of acid production by infected cultures was observed for 8 phages; extensive phage replication at 30 and 38°C, but not at 40°C, was observed for 4 phages, while 11 phages replicated at 30°C but not at 38 or 40°C. Studies in broth media revealed that failure of phage to replicate at 30 and 40°C was not due to lack of host growth in most cases, but due to temp. sensitivity on the part of the phage. In one phage-host system, phage replication continued after growth of the host had ceased. The significance of these findings to starter selection for cheese manufacture is discussed. AS

34

[Koji digestion.]
Marukin Shoyu KK
Japanese Examined Patent 5 612 095 (1981) [Ja]

Process is described for koji digestion in the presence of a specified lactic acid bacteria culture product; the time required is reduced due to the absence of NaCl, which inhibits enzymes such as protease. IFT

35

Studies on degradation of different types of caseins and proteins by Lactobacilli.
Singh, J.; Kaul, A.
Journal of Food Science 46 (6) 1954–1955 (1981) [En]
[Div. of Dairy Bacteriol., Nat. Dairy Res. Inst., Karnal, Haryana, India]

Since little information is available on the role of lactobacilli in the degradation of casein sp. (other than

cow casein) and nonmilk protein substrates, this study was undertaken to gather information on degradative ability of lactobacilli on different protein substrates. Progressive enhancement in the liberation of tyrosine with an increase in incubation period was recorded in all the cultures. As regards the degradative ability of lactobacilli on protein substrates of nondairy origin, an increasing trend in proteolysis rate was noted up to 10 days. Results are of interest on account of faster degradation of certain protein substrates of nondairy origin by lactobacilli which contribute significantly to texture and flavour development in cultured milk-based foods. IFT

36

Heat resistance of *Sporolactobacillus inulinus*.
Doores, S.; Westhoff, D.
Journal of Food Science 46 (3) 810–812 (1981) [11 ref. En] [Dep. of Dairy Sci., Univ. of Maryland, College Park, Maryland 20740, USA]

Sporolactobacillus inulinus (a potential isolate from canned food), was grown on 24 media varying in carbohydrate source (glucose or α-methyl glucose) and concn. A heat-resistant total count (80°C—5 min) and the thermal resistance of the spores isolated from each cell crop were determined. The highest heat-resistant counts were obtained when *S. inulinus* was grown on Sporolactobacillus agar with 2% α-methyl glucoside. Cells grown in Sporolactobacillus broth with 1% α-methyl glucoside yielded the most heat resistant spores. D and z values were determined for each spore crop. Average D values were 53.2 min at 75°C, 19.5 min at 80°C, 6.8 min at 85°C and 5.1 min at 90°C. The average z value was 13.0°C. IFT

37

[Effect of metal ions on growth of bifidobacteria in a hydrolysed milk medium.]
Ervol'der, T. M.; Gudkov, A. V.; Perfil'ev, G. D.; Mikhlin, E. D.
Molochnaya Promyshlennost' No. 2, 28–30 (1981) [12 ref. Ru] [Vses. Nauchno-issled. Inst. Maslodel'noi i Syrodel'noi Promyshlennosti, Uglich, USSR]

A basic medium, comprising 1% lactose, 1% sodium citrate, 1% maize extract, 1% vitamin B_{12} preparation, 0.075% agar and skim milk hydrolysed with a microbial alkaline proteinase was used to study the effect of trace elements on the accumulation of biomass in the production of dried cultures of bifidobacteria. The elements (Fe, Mn, Cu, Zn, Mg, Mo and Co) were used at 3 different concn., i.e. 10^{-3}, 10^{-4} and 10^{-5} M, the test cultures being cultivated at 37.5°C for 72 h. The bacteria had relatively high requirements (10^{-3} M) for Fe^{2+}, Zn^{2+} and Mo^{6+}. Mn and Co did not appreciably affect growth of the bacteria. Adding Cu^{2+} at concn. $> 10^{-4}$ M completely inhibited growth of bifidobacteria. It is concluded that for optimum results Fe^{2+} or Zn^{2+} or Mo^{6+} should be added to the medium at a concn. of 10^{-3} M. FL

38

General properties of a new ribosomal aryl-peptidyl amidase in *Lactobacillus casei*.
El-Soda, M.; Desmazeaud, M. J.
Agricultural and Biological Chemistry 45 (7) 1693–1700 (1981) [32 ref. En] [Lab. de Microbiol., INRA, 78350 Jouy-en-Josas, France]

39

[Lysotyping and resistance to bacteriophage of mesophilic lactic streptococci.]
Boissonnet, B.; Bozio, J. Y.; Briere, C.; Leclerc, M.-C.; Larpent, J. P.
Lait 61 (603/604) 134–139 (1981) [13 ref. Fr, en] [Lab. de Microbiol., 4 Rue Ledru, 63000 Clermont-Ferrand, France]

79 bacteriophages were used to type 164 strains of lactic streptococci; 10 lysotype groups could be defined. 32 strains were sensitive to only 1 phage each, 25 to 2 each, 16 to 3 and 13 to 4; 2 strains were sensitive to 17 phages each. 1 phage showed little specificity and attacked *Streptococcus lactis, S. lactis* subsp. *diacetylactis* and sometimes *S. cremoris*. Phages of *S. cremoris* did not attack *S. lactis* subsp. *diacetylactis* and vice versa. 36 of 105 cheese wheys tested were inactive against 15 industrial strains of mesophilic lactic streptococci; 5 of the strains were not lysed by any of the wheys, and the rest were lysed by from 1 to 48 wheys. The bacteriophage positive wheys were classified mainly into groups VIII and IX, and a few into groups VI and X. CDP

40

[Guidelines for installation and conversion of cleaning units in dairies.]
Norway, Landbruksdepartement
Meieriposten 70 (16) 539 (1981) [No]

Details are given of the requirements which circulation cleaning systems must satisfy in order to be approved for use in Norwegian dairies. It is emphasized that the systems must be installed in such a way that it is impossible to pump unpasteurized products into the pasteurized product sections. Diagrams show recommended arrangements of piping, valves, etc., which prevent mixing of raw and pasteurized products. ADL

41

[Comparative study of the behaviour of *Streptococcus lactis, Streptococcus thermophilus* and *Lactobacillus bulgaricus* in milks and retentates pasteurized after storage at low temperature.]
Tayfour, A.; Milliere, J. B.; Veillet-Poncet, L.
Lait 61 (603/604) 149–170 (1981) [51 ref. Fr, en] [Lab. de Microbiol. Alimentaire, ENSAIA-INPL, 32, Rue Sainte-Catherine, 54000 Nancy, France]

Samples of raw milks and ultrafiltration retentates were stored at 4°C for 72–96 h, at 7°C for 48–72 h and at 12°C for 24–48 h prior to pasteurization at 75°C for 30 s. Mean bacterial counts of milk and retentate resp., which had reached 910 000–37 million/ml and 2.5 million-54 million/ml after storage, fell to 3300–4900 and 1000–7800/ml resp. after pasteurization. *S. lactis*, inoculated at 0.5% after pasteurization, was relatively intensitive to physico-chemical modifications of the milk and retentate resulting from bacterial growth prior to pasteurization. *S. thermophilus* and *L. bulgaricus* showed enhanced growth and lactic acid production in milk and retentates that had been stored at 12°C for 48 h or 7°C for 72 h prior to pasteurization (bacterial count > 5 million/ml at end of storage); growth of these organisms was also enhanced by sterilization (115°C for 10 min) of non-stored milk or retentate. CDP

42

Problems of residual antibiotics in milk.
Kaul, A.; Prasad, C.; Singh, R. S.
Indian Dairyman 33 (5) 329–334 (1981) [En] [Div. of Dairy Bact., Nat. Dairy Res. Inst., Karnal-132 001, India]

Entry of antibiotics into milk, effect of antibiotics residues on lactic acid bacteria, and methods of detection of antibiotics are the aspects covered in this article. CFTRI

43

[Studies on the growth of *Lactobacillus acidophilus* and *Streptococcus thermophilus* in milk added with ginseng extracts.]
Yang, J. W.; Yu, T. J.
Korean Journal of Ginseng Science 3 (2) 113–126 (1979) [34 ref. Ko, en] [Dep. of Food Tech., Korea Ginseng Res. Inst., Korea Univ., Seoul, S. Korea]

Korean red ginseng was extracted with 98% ethanol (RGE) and the ethanol extract extracted with ether (EE) and water. Crude saponin (CS) was extracted from the aqueous layer with n-butanol, and panaxadiol (PD) and panaxatriol (PT) separated by butanol extraction and silica gel chromatography. Addition of RGE at up to 4.0% did not inhibit growth of *Lactobacillus acidophilus* or *Streptococcus thermophilus* in skim milk (TS 12%) at 37°C, but RGE at 8.0% inhibited both organisms. RGE at 0.4–4.0% tended to increase titratable acidity. Addition of CS (at ≤3%), PD or PT (at ≤1.4%) did not significantly affect growth or acid production. The addition of EE at 0.12% caused viable cell counts to decrease and eliminated *S. thermophilus* within 20 h. BWH

44

Purification and properties of β-galactosidase from *Streptococcus thermophilus.*
Ramana Rao, M. V.; Dutta, S. M.
Journal of Food Science 46 (5) 1412–1418 (1981) [En] [Dep. of Microbiol., Nat. Dairy Res. Inst., Karnal-132001, India]

A β-galactosidase from *S. thermophilus* was purified to homogeneity by ammonium sulphate and acetone fractionation, gel filtration on Sephadex G-200, and ion exchange chromatography on DEAE-Sephadex A-50. The purified enzyme preparation exhibited an optimum pH at 6.6–7.0 and an optimum temp. of 57°C. The enzyme was stable at pH 6.8–7.0. Km and V_{max} for the enzyme, using ortho-nitrophenyl β-D-galactopyranoside as the substrate, were 0.25 mM and 83 μmoles/mg protein/min, resp. It was strongly inhibited by Hg^{2+}, Ag^{+}, and Cu^{2+} as well as *p*-chloro-mercuri benzoate. The enzyme had a mol. wt. of about 6×10^5 and was highly specific for β-galactoside bonds. IFT

45

[Effects of heat treatment of soy milk, coagulants and yeast inoculation on texture of soy curd.]
Kawaguchi, Y.
Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 26 (10) 434–441 (1979) [10 ref. Ja, en] [Yamanashi Prefectural Agric. & Forestry High School, Nishiyahata Ryuo-cho, Nakakoma-gun, Yamanashi-ken, Japan]

Curd preparation from soy milk was examined in an attempt to find procedures suitable for producing a cheese-like food. Soy milk treated by a UHT procedure (135°C for 2 s) produced a curd with insufficient hardness, springiness and chewiness for it to be suitable for making a cheese-like food. Studies were made of curd prepared from soy milk with the aid of a lactic starter *(Streptococcus thermophilus)* and 7 coagulants (4 salts and 3 acids). The lactic starter and 2 coagulants ($CaSO_4$ and glucono-δ-lactone) gave excellent results in respect of curd texture at the cutting stage and whey separation. Further studies involved inoculation with *Saccharomyces fragilis* and incubation of the pressed curd at 20°C for 40 days. Curd hardness, cohesiveness, springiness and chewiness were examined during incubation; all but cohesiveness decreased. Use of a lactic starter and inoculation with *Sacc. fragilis* produced a smooth cheese-like texture in the curd. [From En summ.] JA

46

[Changes between yeasts and lactic acid bacteria in brewing. I. Changes between yeasts and lactic acid bacteria in miso brewing in decreased salt.]
Tsukuhara, T.; Nakazato, A.; Takeda, M.
Journal of Agricultural Science [Tokyo Nogyo Daigaku Nogatu Shuho] 90th Anniversary Edition, 53–60 (1981) [22 ref. Ja, en] [Lab. of Fermentation Microbiol., Dep. of Brewing & Fermentation, Tokyo Univ. of Agric., Tokyo, Japan]

25 kinds of miso were made in 5 l lots, with variation in the salt concn. of 0–450 g/1 kg soybean, and in the type of organism inoculated, viz. salt-tolerant yeast, *Saccharomyces rouxii;* sake yeasts; a culture of *Lactobacillus plantarum, strain Srl; a mixture of S. rouxii* and *L. plantarum;* or no inoculum. When no inoculation was made, even a small reduction in salt levels caused acid putrefaction. *S. rouxii* at cell counts of 10^6/g prevented acid putrefaction in miso with at least 6% NaCl. Sake yeasts grew and fermented vigorously in miso with reduced salt, suppressing the growth of lactic acid bacteria and putrefaction. Addition of mixed yeast and lactic acid bacteria promoted the maturation of miso. While yeasts suppressed the growth of lactic acid bacteria, the latter were found to promote the growth of yeasts. [From En summ.] JRR

47

[Effect of starter capable of growing at low temperatures on quality and stability of ripened cream butter.]
Lazauskas, V.
Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti 12, 16–20, 151 (1978) [3 ref. Ru, li, en] [Litovskii Filial VNIIMSP, Kaunas, USSR]

3 strains of *Streptococcus lactis*, 3 of *S. cremoris*, and 2 of *S. lactis* subsp. *diacetylactis*, which were capable of clotting milk normally and giving satisfactory acidity after passages in sterilized milk at 10°C, were selected for formation of 12 combined starter variants. These were cultured at 19–20°C and 1 of them with the following properties was chosen; it had a titratable acidity of 100°T, formed a normal coagulum, had a good

organoleptic score and contained an average 0.370 mg% diacetyl, vs. 95°T, 0.165 mg% diacetyl and slightly lower organoleptic score in the control. In butter made experimentally with the chosen combined starter and examined fresh or after storage for 3 or 6 months, this starter proved to be superior to the control in acid and aroma production and otherwise equal to the control. SKK

48

Starter culture viability in frozen yoghurt.
Miles, J. J.; Leeder, J. G.
Cultured Dairy Products Journal 16 (3) 12–14 (1981) [10 ref. En] [Dep. of Food Sci., Cook Coll., Rutgers, State Univ. of New Jersey, New Brunswick, New Jersey 08903, USA]

Basic yoghurt mix was fermented to a titratable acidity of 0.89–0.95% lactic acid, then mixed with various combinations of maize syrup solids (CSS) and/or sucrose ± glucose, frozen packaged and stored at −28.9°C for 2 wk. In all cases counts of *Lactobacillus bulgaricus* and, to a lesser extent, *Streptococcus thermophilus* decreased during storage. Addition of 0–15% sucrose had little effect on counts of *L. bulgaricus* or *S. thermophilus* before freezing. Counts of *L. bulgaricus* after 1 and 2 wk storage increased with sucrose concn. up to 10%, but decreased with higher concn.; *S. thermophilus* was susceptible to high sucrose concn. only after 2 wk storage. The increased cell recovery produced with 10% sucrose gradually declined as glucose was increasingly substituted for the sucrose. Recovery of *L. bulgaricus* after storage increased slightly with increasing levels of CSS from 0 to 6%, of milk SNF from 0 to 4%, or of Tween 80 from 0 to 0.15%. CDP

49

[Differentiation of streptococcal microflora of Mongolian Byaslak cheese.]
Damdinsuren, L.; Gruev, P.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 25 (2) 341–344 (1978, publ. 1979) [7 ref. Bg] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]

Byaslak [Biaslag] is a Mongolian cheese made by coagulating milk with 5–10% yoghurt (tarag) at 80–90°C, without rennet or salt. 50 streptococcal colonies were isolated from Byaslak cheese made in Sept. 1976, and 15 of these colonies were selected for species differentiation tests. All 15 colonies gave positive results in Sherman's tests for identification of enterococci, (growth in broth with 6.5% NaCl and at pH 9.6; production of NH_3 from arginine; and growth at 16 and 45°C). Two strains appeared to be *Streptococcus faecalis,* since they reduced 0.01% triphenyltetrazolium chloride (TTC) and fermented mannitol. The remaining 13 strains, which did not reduce TTC or methylene blue and did not ferment sorbitol or mannitol, appeared to belong to *S. faecium* subsp. *durans.* There seemed to be transitional types between these species, however. Lactic acid streptococci with enterococcal characteristics were also isolated from the cheese after 12 months' storage at 8–10°C. ADL

50

Use of lactobacilli to preserve fresh meat. [Lecture]
Gilliland, S. E.
Proceedings, Annual Reciprocal Meat Conference of the American Meat Science Association pp. 54–58 (1980) [15 ref. En] [Anim. Sci. Dep., Oklahoma State Univ., Stillwater, Oklahoma 74078, USA]

Studies on inhibition of undesirable microorganisms by lactic acid bacteria in meat and other foods are briefly discussed, and tables of data are given. Inhibitory effects of lactic streptococci, pediococci, lactobacilli, and *Leuconostoc* spp. are discussed, with reference to their activity against various pathogenic and spoilage bacteria at temp. permitting rapid bacterial growth, under refrigerated conditions, and in vacuum packs. Mechanisms of the inhibitory activity are discussed, with reference to production of lactic acid, other acids, and H_2O_2. [See FSTA (1982) 14 4S570.] AJDW

51

Effects of acids on potassium sorbate inhibition of food-related microorganisms in culture media.
Restaino, L.; Komatsu, K. K.; Syracuse, M. J.
Journal of Food Science 47 (1) 134–138, 143 (1982) [En] [Armour Res. Cent., 15101 N. Scottsdale Road, Scottsdale, Arizona 85260, USA]

Effects of potassium sorbate in combination with citric, lactic, phosphoric, and hydrochloric acids on the growth of 6 food-related microorganisms were studied. Trypticase soy broth with 0.1 or 0.2% sorbate adjusted to pH 5.5 with any of the acids was bacteriostatic to *Yersinia enterocolitica* 0:17. These combinations at pH 5.5 were also bacteriostatic to *Salmonella* group D, and extended the lag phase of *Pseudomonas fluorescens* for 24 h. Combinations of either organic acid with 0.2% sorbate at pH 5.5, reduced the growth rate of *Lactobacillus plantarum* and an unidentified *Lactobacillus* isolated from frankfurters. *Pseudomonas aeruginosa* was unaffected by any sorbate-acid combination. Organic acids, specifically citric and lactic, potentiate the antimicrobial action of potassium sorbate. IFT

52

[Revitalization and use of dried lactic acid bacteria for processing table olives by the Silvigliano method.]
Pelagatti, O.; Brighigna, A.
Industrie Alimentari 20 (3) 182–184 (1981) [3 ref. It] [Istituto Sperimentale per la Elaiotecnica, Pescara, Italy]

With a view to encouraging commercial use of the Sivigliano method [see FSTA (1981) 13 8J1138] of processing green olives with spray-dried lactic acid bacteria, research was undertaken to develop a simple technique for revitalizing the bacteria. 3 media were tried on 400 mg samples of dried strains of *Lactobacillus plantarum* (48 h at 37°C). The 2 media that gave best fermentation were compared in tests on Nocellara Etnea olives inoculated with the revitalized organisms. The olives were examined at intervals over 60 days for microbial flora (aerobic and lactic acid bacilli, yeasts, fungi and *Aerobacter aerogenes)* and for chemical characteristics (pH, reducing sugars, total acidity). Results (tabulated) suggested that the most successful medium would be the one containing 8.5 g NaCl, 10 g glucose and 3 g yeast in 1000 ml distilled water at pH 6.4. KME

53

[Formation of ester and esterase activity in lactic acid bacteria.] [Lecture]
Hosono, A.
Japanese Journal of Dairy and Food Science [Rakuno Kagaku Shokuhin no Kenkyu] 29 (6) 240–243 (1980) [14 ref. Ja] [Fac. of Agric., Shinshu Univ., Matsumoto, Japan]

Studies on the formation of esters by lactic acid bacteria, particularly during the ripening of Cheddar cheese are reviewed. [See FSTA (1982) 14 5P676.] BWH

54

Solubility of muscle proteins as a result of autolysis and microbiological growth.
Chen, M. T.; Ockerman, H. W.; Cahill, V. R.; Plimpton, R. F., Jr.; Parrett, N. A.
Journal of Food Science 46 (4) 1139–1143, 1158 (1981) [46 ref. En] [Dep. of Anim. Sci., Ohio State Univ., Columbus, Ohio 43210, USA]

Bovine *longissimus dorsi* samples, collected aseptically 3 h postmortem, were used to determine natural muscle enzyme activity. Samples of this tissue were inoculated with *Pseudomonas putrefaciens* or *Lactobacillus casei* and incubated 0, 1, 7, 14, and 21 days at 2°C and 0, 1, and 3 days at 25° and 37°C. Protein solubility, pH and microbial counts were determined after appropriate periods of storage. Only small differences were noted in the solubility of muscle proteins between the muscle treatments after 21 days of storage at 2°C, compared to much larger differences noted after only 3 days of storage at higher incubation temp. (25° and 37°C). IFT

55

Inhibitory and stimulatory effects of oregano on *Lactobacillus plantarum* and *Pediococcus cerevisiae*.
Zaika, L. L.; Kissinger, J. C.
Journal of Food Science 46 (4) 1205–1210 (1981) [27 ref. En] [USDA-SEA-AR, Eastern Reg. Res. Cent., 600 E. Mermaid Lane, Philadelphia, Pennsylvania 19118, USA]

Increasing concn. of oregano from 0.5 to 8 g/l in a liquid medium resulted in stimulation, delay, or inhibition of acid production and viability of *L. planatarum* and *P. cerevisiae*. The inhibitory factor could be removed from oregano by solvent extraction or autoclaving; residues from these treatments stimulated acid production by the organisms. Organisms growing in media containing sublethal oregano concn. that had delayed growth and acid production developed resistance to the deleterious effects of the spice. *L. plantarum* was more resistant than *P. cerevisiae* to the inhibitory effects of oregano. IFT

56

[Some characteristics of *Leuconostoc dextranicum* phage Ld-6.]
Shin, C.; Sato, Y.
Japanese Journal of Zootechnical Science [Nihon Chikusan Gakkai-ho] 52 (9) 639–645 (1981) [31 ref. Ja, en] [Lab. of Food Sci. & Tech., Nagoya Holy Spirit Junior Coll., Seto-shi 489, Japan]

57

Antibacterial effect of tertiary butylhydroquinone against two genera of Gram positive cocci.
Raccach, M.; Henningsen, E. C.
Journal of Food Science 47 (1) 106–109 (1982) [En] [Div. of Agric., Arizona State Univ., Tempe, Arizona 85287, USA]

The min. inhibitory concn. (MIC) of tertiary butylhydroquinone (TBHQ) against *Pediococcus pentosaceus* in a bacteriological medium was 15 μg/ml for 10^3–10^5 cells/ml and 20 μg/ml for 10^6 cells/ml. Heat stress and NaCl were each synergistic to the inhibitory effect of TBHQ. Production of both L and D lactic acid was inhibited by TBHQ. Fermentation of sucrose was totally inhibited by 5 μg/ml TBHQ as compared to 10 μg/ml TBHQ for L-arabinose, D-galactose and maltose and to 15 μg/ml TBHQ for glucose. TBHQ (50 μg/ml) did not inhibit growth of 1.2×10^3 cells of *Staphylococcus aureus* z-88, but 30 μg/ml totally inhibited growth of 3.0×10^3 cells of *S. aureus* 100 for 36 h. TBHQ (100 μg/ml) was bactericidal against the latter strain. TBHQ (10–50 μg/ml) slightly inhibited production of non heat-treated nuclease but had little or no effect on heat-treated nuclease of *S. aureus* z-88. IFT

58

Production of L- and D-lactate by *Pediococcus pentosaceus* in batch and steady-state continuous culture.
Häggström, M. H.; Andersson, E.
Journal of Applied Bacteriology 52 (1) 119–123 (1982) [10 ref. En] [Dep. of Tech. Microbiol., Univ. of Lund, Lund, Sweden]

The fast growth and acid production of a strain of *Pediococcus pentosaceus*, used as a starter culture in the production of dry sausages, was dependent on the presence of acetate. In a batch culture on a mixture of glucose and sucrose both sugars were consumed simultaneously. Similar growth rates and product yields were obtained on glucose and sucrose. D- and L-lactate were produced via a D- and L-lactate dehydrogenase (LDH), resp., and no racemase was present. In batch cultures about 15% of the lactic acid produced was the D-isomer, whereas in a sucrose-limited continuous culture the fraction of D-lactic acid increased with decreasing dilution rate. The results are discussed in relation to the 2 LDH activities. AS

59

Fermentation may answer needs for 'natural' foods, low-energy processes.
Anon.
Food Product Development **14** (9) 48–49 (1980) [En]

The possible future use of lactic acid bacterial cultures in meat not usually fermented, in dairy products, and in vegetables, to provide natural food preservation is considered. Its use could reduce the need for additives and decrease energy input. VJG

60

[Manufacture of a cheese-like product from soybean milk. IV.]
Matsuoka, H.; Fuke, Y.
Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] **24** (11) 553–558 (1977) [10 ref. Ja, en] [Dep. of Food & Nutr., Tachikawa Coll. of Tokyo, Azuma-cho, Akishima-shi, Tokyo, Japan]

Soybean milk was coagulated by lactic fermentation using *Streptococcus thermophilus, S. lactis* or a mixture of *S. thermophilus* and *S. lactis.* The curds obtained were ripened by *Penicillium caseicolum.* Curd pH was approx. 6.5 after ripening for 2 wk. Contents of water-soluble N and free amino acids increased during ripening. Amino acids liberated in comparatively large amounts included glutamic acid, aspartic acid and lysine. In order to retard ripening, the curds were coated with paraffin after removal of surface mould, and stored at 5°C. Trypsin inhibitor activity did not change during ripening. [From En summ.] JA

61

Effect of *Lactobacillus brevis, Saccharomyces uvarum* and grist composition on amine formations in beer.
Zee, J. A.; Simard, R. E.; Vaillancourt, R.; Boudreau, A.
Canadian Institute of Food Science and Technology Journal **14** (4) 321–325 (1981) [24 ref. En, fr] [Dep. des Vivres, Univ. Laval, Quebec G1K 7P4, Canada]

The influence of *L. brevis* and *S. uvarum,* the type of malt (2- and 6-row) and adjuncts (corn syrup, corn, wheat, barley and rice) on biogenic amine contents in unfermented and fermented worts were studied. Histamine, putrescine, tyramine and agmatine contents were determined by an ion-exchange chromatographic method. *L. brevis* produced putrescine and tyramine, but reduced the agmatine content in worts. *S. uvarum* did not produce amines. The 2-row malts contributed less to amine contents than the 6-row malts. Partial substitution of malt by adjuncts, in particular increasing amounts of rice (20 and 40%), resulted in lower amine contents in fermented worts. AS

62

Lactic fermentation of soymilk. [Review]
Patel, A. A.; Waghmare, W. M.; Gupta, S. K.
Process Biochemistry **15** (7) 9–10, 12–13 (1980) [55 ref. En] [Nat. Dairy Res. Inst., Karnal, India]

Research on lactic fermentation of soy milk is reviewed under the following headings: soy milk as substrate for growth of lactic cultures, covering effects of heat treatment, other processing parameters, presence of fermentable carbohydrates and certain additives; other culturing conditions affecting growth of lactic cultures in soy milk; quality of cultured soy milk, including flavour and texture; growth of aroma bacteria and development of flavour compounds in soy milk; and special products from lactic fermented soy milk. SP

63

Entrance and growth of lactic acid bacteria in gas-exchanged, brined cucumbers.
Daeschel, M. A.; Fleming, H. P.
Applied and Environmental Microbiology **42** (6) 1111–1118 (1981) [13 ref. En] [Food Fermentation Lab., USDA, Raleigh, N. Carolina 27650, USA]

Entrance of lactic acid bacteria into the interior of brined cucumbers was found to be greatly influenced by gas composition of the cucumbers before brining. Exchange of the internal gas of fresh cucumbers with O_2 resulted in absorption of bacteria into the subsequently brined fruit within a few hours. Bacteria were absorbed into nonexchanged cucumbers to a lesser extent. Little bacterial absorption occurred in N_2-exchanged cucumbers. Stomata of the cucumber skin appeared to be a likely port for bacterial entry. When *Pediococcus cerevisiae* or *Lactobacillus plantarum* cells were added to the brine of O_2-exchanged cucumbers, the respective cell types colonized in large numbers within intercellular spaces and vascular elements of mesocarp tissue during fermentation of the cucumbers. Implications of these observations, particularly with regard to bloater formation in brined cucumbers, are discussed. AS

64

The value of plasmid profiles for strain identification in lactic streptococci and the relationship between *Streptococcus lactis* 712, ML3 and C2.
Davies, F. L.; Underwood, H. M.; Gasson, M. J.
Journal of Applied Bacteriology **51** (2) 325–337 (1981) [18 ref. En] [Nat. Inst. for Res. In Dairying, Shinfield, Reading RG2 9AT, UK]

65

An agar medium for the differential enumeration of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* in yoghurt.
Bracquart, P.
Journal of Applied Bacteriology **51** (2) 303–305 (1981) [7 ref. En] [Lab. of Applied Biochem., Univ. of Nancy 1, 54037 Nancy Cedex, France]

The agar medium tested contained tryptose, proteose peptone, yeast extract, glucose, lactose, Tween 80 and Eriochrome Black T, the Eriochrome being added

directly to the plates prior to pouring the sterile medium. After anaerobic incubation for 24 h at 42°C in a 'candle jar', *Streptococcus thermophilus* colonies were circular or semi-circular, 1–3 mm diam., convex, opaque white-violet, often with a darker centre; *Lactobacillus bulgaricus* colonies were transparent, diffuse, 4–6 mm diam., and of irregular shape. The medium was as good as M17 medium for enumeration of *S. thermophilus* and better than MRS medium for enumeration of *L. bulgaricus*. Because the medium is non-selective, it cannot be used when a great imbalance exists between the 2 microorganisms. CDP

66

[Cultured milk drink, "Yakult 80".] [Review]
Mutai, M.
New Food Industry [Nyu Fudo Indasutori] 23 (7) 33–41 (1981) [34 ref. Ja] [Cent. Lab., KK Yakult, Japan]

Effect of regular intake of lactic acid bacteria, (particularly *Lactobacillus casei* the "Yakult bacillus") on health, especially in relation to the composition of the intestinal bacterial flora, is reviewed. The significance of vitamin C and calcium (consumed in cultured milk drinks) is also discussed. BWH

67

Stimulation of lactic starter cultures by filtrates from milk cultures of some proteolytic spore-formers. III. *B. pumilus* culture filtrates.
Shehata, A. E.; Magdoub, M. N. I.; Fayed, E. O.; Hofi, A. A.
Milchwissenschaft 35 (10) 607–609 (1980) [11 ref. En, de] [Food Sci. Dep., Fac. of Agric., Ain Shams Univ., Shoubra El-Khaima, Cairo, Egypt]

Bacillus pumilus, isolated from buffaloes' raw milk and with high proteolytic activity, was cultured in cows' skim milk at 32°C for 3, 5, 7 and 9 days and then Seitz filtered. Addition of the filtrates to cultures of *Streptococcus lactis* in cows' sterilized skim milk, increased total viable counts and titratable acidity, the most pronounced effect being obtained with the 5-day culture filtrate (counts increased by 215%, acidity by 44%). There was a smaller increase in viable counts and acidity when the filtrates were boiled for 5 min before addition to the *Str. lactis* culture. In the absence of *Str. lactis*, addition of the raw filtrates to the sterilized skim milk caused proteolysis to occur; this proteolytic activity was destroyed by boiling the filtrates for 5 min. The stimulatory effect of cell-free filtrates from milk cultures of *B. pumilus* is probably due to protein degradation by-products and possibly also to proteolytic enzymes. [See FSTA (1981) 13 6P901.]

68

Depletion of sodium nitrite by lactic acid bacteria isolated from vacuum-packed bologna.
Collins-Thompson, D. L.; Rodriguez Lopez, G.
Journal of Food Protection 44 (8) 593–595 (1981) [15 ref. En] [Dep. of Environmental Biol., Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada]

Cultures of lactic acid bacteria isolated from commercial samples of vacuum-packed bologna were used in the studies, the bacteria being identified as *Leuconostoc mesenteroides, Lactobacillus plantarum, Lactobacillus viridescens, Lactobacillus brevis* and *Brochothrix thermosphacta*. Preliminary studies involved detn. of the degree of microbial depletion of nitrite by these bacteria, under anaerobic conditions in APT broth containing $NaNO_2$ and incubated at 5° or 15°C; the degree of non-microbial depletion of nitrite was also determined. The greatest reduction of nitrite was observed with *L. mesenteroides*, followed by *L. plantarum* and *L. viridescens*, while both *L. brevis* and *B. thermosphacta* showed nitrite depletion similar to that in uninoculated broth; in all cases, nitrite depletion was much greater at 15°C than at 5°C. Further studies examined nitrite depletion by the lactic acid bacteria in non-irradiated and irradiated (0.3 Mrad) samples of vacuum-packed bologna stored at 5°C for 4 wk after inoculation with the bacteria. Some nitrite was found to be lost as a result of irradiation. The level of nitrite depletion by the individual bacteria was similar to that in the broth, with *L. mesenteroides* producing the greatest reduction and *L. brevis* and *B. thermosphacta* the smallest. JA

69

Characteristics of lactic acid bacteria isolated from vacuum-packaged beef.
Hitchener, B. J.; Egan, A. F.; Rogers, P. J.
Journal of Applied Bacteriology 52 (1) 31–37 (1982) [En] [CSIRO Div. of Food Res., Meat Res. Lab., Cannon Hill, Queensland 4170, Australia]

The characteristics of 177 psychrotrophic lactic acid bacteria isolated from vacuum-packaged fresh beef were studied. 18 isolates were identified as *Leuconostoc mesenteroides* and the remainder were lactobacilli. None of these could be identified down to a sp. level and they were considered to be atypical streptobacteria or atypical betabacteria. Atypical streptobacteria produced both isomers of lactic acid and did not ferment lactose and maltose. Atypical betabacteria produced only L(+) lactic acid. The nature of the isolates varied considerably from pack to pack. The API 50 lactobacillus identification system proved useful in studying these organisms. AS

70

[Rapid selective detection of yeasts and lactic acid bacteria in delicatessen products by the membrane filter microcolony fluorescence method.] Selektiver Schnellnachweis von Hefen und Milchsäurebakterien in Feinkosterzeugnissen mit der Membranfilter-Mikrokolonie-Fluoreszenz-Methode (MMCF-Methode).
Baumgart, J.; Hobel, A.; Rottensteiner, B.
Zeitschrift für Lebensmittel-Technologie und -Verfahrenstechnik 32 (6) 251–252 (1981) [2 ref. De]
[Lab. für Lebensmittel-Mikrobiologie, Fachhochschule Lippe, Liebigstrasse 87, 4920 Lemgo, Federal Republic of Germany]

Samples of delicatessen salad or ketchup are homogenized with peptone water in a stomacher; serial dilutions are prepared from the homogenate. 10 ml of dilute homogenate are filtered through a non-fluorescent membrane filter, pore size 0.45 µm. For detn. of yeasts, the filter is then incubated on a sterile incubating pad previously soaked in malt extract broth + chloramphenicol + ANS (magnesium salt of 8-anilino-naphtalene-1-sulphonic acid); for detn. of lactic acid bacteria, the membrane filter is incubated on a sterile incubating pad soaked in MRS broth + actidione + ANS. After incubation, the membrane filters are dried, and examined under a fluorescence microscope. Studies were conducted by this method on 40 non-preserved samples of delicatessen salad and 40 of tomato ketchup. Comparison of the membrane filter method with the drop method showed the methods to agree well; the membrane filter method is, however, faster. Yeasts may be determined in 15 h, lactobacilli in 24–36 h. AJDW

71

[Growth of yeast and lactic acid bacteria during miso making.]
Koizumi, Y.; Hatori, H.; Yanagida, F.; Ito, A.; Yamaguchi, M.
Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi] 76 (3) 206–210 (1981) [6 ref. Ja, en]
[Dep. of Brewing, Tokyo Univ. of Agric., Setagaya-ku, Tokyo, Japan]

Yeast and lactic bacteria were added to a liquid medium or miso mash and effects on the flavour components were examined. In both liquid medium and miso mash, growth of lactic acid bacteria was dominant from the beginning, regardless of the initial cell number added. The higher the number of lactic acid bacteria, the faster the pH decreased and the max. growth was established. Rapid alcohol formation inhibited the growth of lactic acid bacteria. Free amino acids increased in miso mash, regardless of the number of lactic acid bacteria. Large additions of lactic acid bacteria increased organic acids and improved the colour of miso. In a sensory evaluation, large counts of lactic acid bacteria gave an improved saltiness and taste but also a sourness to miso. YN

72

[Innovations in the manufacturing programme of the sugar industry.]
Langen, A.
Sucrerie Belge 100 (10) 327–332 (1981) [33 ref. Fr, nl, en, de] [Pfeifer Langen, Cologne, Federal Republic of Germany]

Innovations introduced at Pfeifer & Langen during the last 30 yr are reviewed with the aid of examples including: from fermentation technology the production of dextran by *Leuconostoc mesenteroides*, development of new sugar products (preserving sugar, icing sugar, fat-sugar powder, liquid sugars), potato snack foods, instant products, recovery of beet non-sugars, and enzymic saccharification processes and biotechnology of starch. The importance of research, and criteria of success are discussed. RM

73

Sterilization of sugar products by irradiation. The effect of gamma radiation on *Leuconostoc mesenteroides*.
Lodos, J.; Acosta, S.
Zuckerindustrie 106 (9) 816–819 (1981) [12 ref. En, de, fr, es] [Cuban Sugar Res. Inst. (ICINAZ), Havana, Cuba]

L. mesenteroides strains isolated from chopped sugar cane were used to investigate the application of γ-irradiation to sugar factory juices. It was shown with the aid of diagrams that decimal reduction (90%) in the count was achieved by 940 p.p.m. formaldehyde, 27 000 rad for *L. mesenteroides* suspensions (20 min at 50 rad/s) and 45 000 rad for *L. mesenteroides* in cane juice (suggesting a radioprotective effect of cane juice components). Comparison of the cost for achieving a similar bactericidal effect by formaldehyde or irradiation was distinctly in favour of irradiation. RM

74

[Effect of temperature on acetate and lactate formation by heterofermentative sour dough bacteria.] Über den Einfluss der Temperatur auf die Bildung von Acetat und Lactat durch heterofermentative Sauerteigbakterien.
Spicher, G.; Rabe, E.
Getreide, Mehl und Brot 34 (3) 65–67 (1980) [6 ref. De]
[Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Detmold, Federal Republic of Germany]

In a rye sour dough, the heterofermentative sour dough bacteria *Lactobacillus brevis* var. *lindneri*, *L. brevis*, *L. fermentum*, *L. buchneri* and *L. fructivorans* synthesized lactic and acetic acids at different rates, the temp. (20–35°C range tested) having a distinct effect; acetate formation did not change markedly with rising temp., but there was a considerable increase in lactate formation (primarily in the L-form). HBr

75

[Study of various detergents and sterilizers as possible induction agents of lysogenic properties in lactic acid bacteria.] Prüfung verschiedener Reinigungs- und Entkeimungsmittel als mögliche Induktionsagenzien lysogener Milchsäurebakterien.
Pop, M.; Kurmann, J. L.
Schweizerische Milchzeitung 107 (48) 317–318 (1981) [7 ref. De] [Eidg. Forschungsanstalt für Milchwirtschaft, 3097 Liebefeld-Bern, Switzerland]

The possible effects of contamination of cultures or cheese milk by residues of detergents and/or sterilizers (D/S) on production of acid and of morphological changes indicating lytic multiplication of bacteriophages [see FSTA (1981) 13 1P83] in lactic acid bacteria were investigated. Effects of 17 named D/S products on growth of mixed strains of streptococci or lactobacilli were studied. Individual D/S were tested at 10^{-2}, 10^{-3} and 10^{-4} dilutions of the recommended concn., and growth was studied in peptone/rennet whey, MRS broth, reconstituted dried skim milk sterilized at 111°C for 30 min, or in raw cheese milk. Tex, Teepol, Duolit 1, Bardac 2, X (not available commercially), Tegol and Vantocyl caused growth reduction in the first 2 media, and some of them changed cell morphology, but the presence of virulent bacteriophages could not be confirmed because of lack of indicator strains. No changes in acid production or morphology were detected in any of the tests in the milk media. SKK

76

[Study of the properties of *Lactobacillus acidophilus* strains for use in starters.]
Bulanova, T. I.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti No. 49, 16–17 (1979) [Ru]

Strains of *L. acidophilus* from the collection at Central Microbiological Laboratory VNIMI, Moscow were studied for high acid-producing and antibiotic activity, and high resistence to phenol, these characteristics being associated with the ability of *L. acidophilus* strains to live in the gastro-intestinal tract and inhibit undesirable intestinal flora. About 20% of the 37 strains tested were high acid producers, coagulating milk in 4–5 h when inoculated at 1.0–3.0%. All strains strongly reduced methylene-blue and 7 had high inhibitory activity (titre 1/32) towards *Escherichia coli*. About half of the strains were resistant to 0.5% phenol and 4 to 0.6% phenol. Nine strains with the best combinations of the desirable charateristics were used as starter components and their effects on organoleptic properties of the starters were evaluated. FL

77

[Milk products made with *Lactobacillus acidophilus*.] Milchprodukte hergestellt mit *Lactobacillus acidophilus*.
Miller, B.
Deutsche Molkerei-Zeitung 102 (40) 1304–1306; (43) 1425–1426; (48) 1615–1617; (50) 1684–1686 (1981) [32 ref. De] [Lab. für Milchwissenschaft, Eidg. Tech. Hochschule, Zürich, Switzerland]

See FSTA (1981) 13 11P2025.

78

[Antibiotic properties of yeasts isolated from koumiss.]
Ospanova, M. Sh.; Popova, G. M.
Molochnaya Promyshlennost' No. 10, 21–22, 46 (1981) [3 ref. Ru] [Inst. Mikrobiol. & Virusologii Akad. Nauk. Kazakhskri SSR, USSR]

Strains of lactic acid bacteria (streptococci and lactobacilli) and of yeasts (15 strains) isolated from koumiss produced in different localities of the Alma-Ata region were tested for physiological, biochemical and antagonistic properties (against *Staphylococcus aureus, Bacillus subtilis, B. mycoides* and *Mycobacterium citreum*). A starter compiled from some of the strains tested and comprising *Lactobacillus bulgaricus, Streptococcus lactis*, and *Torulopsis kumis* strain 17, was used in the preparation of koumiss from sterile mares' milk. In tests for antagonistic capacity, 5- or 7-day old koumiss was particularly effective against the 4 test organisms. Use of selected yeast strains with high antibiotic activity in starters for koumiss manufacture is recommended. FL

79

[Use of concentrates of lactic acid bacteria in smetana (cultured cream) production.]
Silant'eva, L. A.; Rymyan, M. N.
Molochnaya Promyshlennost' No. 10, 19–20 (1981) [4 ref. Ru] [Leningradskii Tekh. Inst. Kholodil'noi Promyshlennosti, Leningrad, USSR]

A starter comprising mesophilic streptococci (*Streptococcus lactis, S. cremoris, S. lactis* subsp. *diacetylactis* and *S. acetoinicus*) was concentrated by centrifugation after 12 h cultivation to a concentrate with about 27×10^9 viable bacteria/ml (52% being aroma-producing streptococci). The concentrate was then mixed with an equal vol. of a protective substrate (10% sucrose solution with 5% sodium citrate), frozen at −20°C and stored at this temp. or at 0°C for 6 wk. Survival of the bacteria was good at −20°C but poor at 0°C. The frozen concentrate (stored at −20°C) was used at 2% in the manufacture of 20%-fat smetana and compared with a conventional starter. Smetana produced using the concentrates had higher counts of aroma-producing streptococci and higher viscosity than the control, and a pleasant flavour and aroma and good consistency. FL

80

[Effects of a starter consisting of *Streptococcus lactis* and *Lactobacillus casei* 7a on quality and ripening of White Pickled cheese.]
Gruev, P.; Prodanski, P.; Simova, E.
Nauchni Trudove, Vissh Institut po Khranitelna i Vkusova Promyshlennost 25 (2) 333–335 (1978, publ. 1979) [13 ref. Bg] [Vissh Inst. po Khranitelna i Vkusova Promishlenost, Plovdiv, Bulgaria]

Experimental batches of White Pickled cheese made from cows' and ewes' milk with 0.4% of a 1:1 *Streptococcus lactis/Lactobacillus casei* 7a starter (with or without 0.06% yoghurt) reached full maturity within 20 days and had better organoleptic quality than control cheeses made in the normal way with 0.1% of a 9:1 *S. lactis/L. casei* starter and 0.06% yoghurt. After 20 days, the experimental cheeses contained 200-

320 million lactic acid bacteria/g and 18.8% of their total N content (vs. 14% for the control cheeses) was soluble N. At all stages of ripening the amino N content was higher in the experimental than in the control cheeses. ADL

81

[Use of bifidobacteria in preparation of twarog and cultured milk.]

Lipinska, E.; Kosikowska, M.; Jakubczyk, E.; Lipniewska, D.; Mamczarek, B.

Roczniki Instytutu Przemyslu Mleczarskiego **21** (1) 35–51 (1979, publ. 1981) [43 ref. Pl, ru, en] [Inst. Przemyslu Mleczarskiego, 00-682, Warsaw, Poland]

13 strains of *Bifidobacterium bifidum*, 3 modified yoghurt starters, 2 microgenic strains of *Streptococcus thermophilus* [See FSTA (1979) **11** 3P424] and a Danish (Flora Danica) and a Polish butter starter were studied. Milk with 2% fat, pasteurized and cooled to 45°C was used; culturing of *B. bifidum* strains, preparation from them of starters, and preparation of twarog and cultured milk on laboratory, pilot and industrial scales are described in detail. Characteristics of strains, and acidities and organoleptic qualities of cultured milks and twarogs are tabulated in full. Cultured milks based on use of the chosen strains of *B. bifidum* with either the butter starter, the *S. thermophilus* strain, or the yoghurt starter, and twarog made with the *B. bifidum* strains and butter starter were assessed organoleptically and for acceptability as valuable new products. They were characterized by a stable proportion (50–60%) of *B. bifidum* in their microflora, corresponding to contents of 0.8–3.5 × 108 live bifidus cells/ml or g; and maintained their initial quality during storage for 4 days at 4°C. SKK

82

[Selection of mesophilic lactic streptococci for tvorog starters to prevent excessive acidity.]

Ivanova, V. P.

Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti No. 49, 23 (1979) [Ru] [Leningradskoe Otdelenie VNIMI, Leningrad, USSR]

Strains of *Streptococcus lactis, S. cremoris* and *S. acetoinicus*, with temp. optima of 25°C and antagonistic to the microflora causing over-acidification of tvorog, were selected for use in tvorog starters. Two types of starters were developed: one comprising *S. lactis* and *S. cremoris* for use in the summer/autumn period and one comprising the 2 streptococci plus *S. acetoinicus* for use in the winter and spring. The introduction of these starters improved the quality of tvorog. FL

83

[Lactic acid beverages from whey protein concentrates.]

Rossi, J.; Costamagna, L.

Lait **61** (608) 494–502 (1981) [29 ref. Fr, en] [Istituto di Microbiol. Lattiero-casearia, Fac. di Agraria di Perugia, Perugia, Italy]

Whey protein concentrate was spray-dried and reconstituted to 10%, heat-treated at 80°C for 30 min and adjusted to pH 6.9 prior to inoculation and incubation at 40°C with (i) *Lactobacillus acidophilus*, (ii) *Bifidolacterium bifidum* or (iii) *L. bulgaricus/Streptococcus thermophilus*. Similar incubations were carried out with inoculated control milk. Coagulation time with (iii) was 4.3 h in whey and 6.45 h in milk vs. >20 h with (i) or (ii) in either medium. The whey product coagulated with (iii) had a homogeneous, firm consistency, with a pH of 4.8, lactose content of 0.36%, protein content of 5.92%, and bacterial content of 490 000 lactobacilli and 84 million streptococci/g. The profile of essential amino acids in the whey product showed it to be rich in threonine, valine, isoleucine, leucine, lysine and tryptophan. The % of essential amino acids liberated after enzymic digestion were generally higher from the whey product than from the corresponding milk product. CDP

84

Process for the treatment of meat with compositions including *Micrococcus varians* and a lactic acid producing bacteria.

Gryczka, A. J.; Shah, R. B. (Microlife Technics Inc.)

United States Patent 4 304 868 (1981) [En]

An improved process is described for producing superior flavour in fermented meat, particularly sausage, using *Micrococcus varians* mixed with *Pediococcus cerevisiae* NRRL-B-5627 and/or with other lactic acid-producing meat-fermenting bacteria to lower the pH. *Micrococcus varians* is a very poor producer of lactic acid and alone cannot produce acceptable sausage. The improved bacterial compositions develop the solid bright red colour associated with sausage and other fermented meats in the presence of edible nitrate and/or edible nitrite. Combinations of the nitrite and nitrate can be used. No acid-forming chemicals, such as gluconic acid or lactone, are used in the fermentation process. The bacterial composition is preferably in the form of a frozen cell concentrate for storage, and is subsequent thawed for use. AS

85

Control of *Staphylococcus aureus* in dry sausage by a newly developed meat starter culture and phenolic-type antioxidants.

Raccach, M.

Journal of Food Protection **44** (9) 665–669 (1981) [25 ref. En] [Microlife Technics, PO Box 3917, Sarasota, Florida 33578, USA]

Genoa sausage and pepperoni inoculated with Lactacel 75 (a selected strain of *Pediococcus* sp.) attained pH 5.0 after 12 and 11 h, resp. at 35°C and after 48 and 40 h, resp. at 21°C. Lactacel 75 controlled the growth of *S. aureus* in the outer surface (0.5–1.0 cm, depth) of both Genoa sausage and pepperoni during the fermentation period to attain pH 5.0. In Genoa sausage, the population of *S. aureus*, in association with Lactacel 75, was up to 1000-fold lower than the min. level associated with enterotoxin production. The generation times of *S. aureus*, in association with Lactacel 75, (in Genoa sausage) were up to 15 times longer than those of the pathogen growing alone. In Genoa sausage at 21°C, Lactacel 75 was bactericidal, causing a 42% decrease in the population of *S. aureus*. Lactacel <75, in

combination with butylated hydroxyanisole and butylated hydroxytoluene, brought about a 67% inhibition of growth of *S. aureus* in Genoa sausage, as compared to the growth of the pathogen in the absence of the starter culture and the phenolic-type antioxidants. In pepperoni at 35°C, Lactacel 75 prevented a >2 log increase in the population of *S. aureus*. AS

86

Rehydration of freeze-dried cultures of lactic streptococci.
Sinha, R. N.; Shukla, A. K.; Lal, M.; Ranganathan, B.
Journal of Food Science 47 (2) 668–669 (1982) [En]
[Div. of Dairy Bact., Nat. Dairy Res. Inst., Karnal-132001, Haryana, India]

Cell suspensions (0.2 ml) of 3 lactic streptococci were freeze-dried from distilled water. In order to determine the optimum conditions of rehydration the effect of different factors such as composition, temp., and pH of rehydrating media on viability of the freeze-dried cells of the lactic streptococci was studied. Rehydration of freeze-dried cells with 10% solution of dextrose, sucrose or reconstituted skim milk at pH 6.5 and 22°C are recommended as optimum conditions for max. recovery of viable cells. IFT

87

Comparison of *Leuconostoc oenos* strains ML-34 and PSU-1 to induce malo-lactic fermentation in Pennsylvania red table wines.
Beelman, R. B.; McArdle, F. J.; Duke, G. R.
American Journal of Enology and Viticulture 31 (3) 269–276 (1980) [13 ref. En] [Dep. of Food Sci., Pennsylvania State Univ., Univ. Park, Pennsylvania 16802, USA]

Leuconostoc oenos strains ML-34 and PSU-1 were compared for their ability to induce a rapid malo-lactic fermentation following pure culture inoculation into Pennsylvania red table wines. PSU-1 consistently induced malo-lactic fermentation faster than ML-34 in wines made using the traditional method of colour extraction from both French-American hybrid and *Vitis vinifera* var. grown under eastern conditions. PSU-1 also induced malo-lactic fermentation more rapidly than ML-34 in wines made using several variations in the hot-press method of colour extraction. The fastest rates of malo-lactic fermentation were observed in wines made without the addition of pectic enzyme or SO_2. The differences in time required for complete malo-lactic fermentation between wines inoculated with the 2 bacterial strains were rather consistent and were greater in those wines made without treatment with pectic enzyme. AS

88

Identification of a growth stimulant for *Lactobacillus sanfrancisco*.
Berg, R. W.; Sandine, W. E.; Anderson, A. W.
Applied and Environmental Microbiology 42 (5) 786–788 (1981) [12 ref. En] [Dep. of Microbiol., Oregon State Univ., Corvallis, Oregon 97331, USA]

A compound required for the luxuriant growth of the sourdough bacterium *Lactobacillus sanfrancisco* (used in the production of San Francisco sourdough French bread) in a laboratory media was isolated from a freshly prepared yeast extract, purified and characterized. The stimulant was identified as a small peptide with mol. wt. approx. 1065, containing aspartic acid, cysteine, glutamic acid, glycine, and lysine. AL

89

[Selection of antagonistic starters and their use in tvorog manufacture.]
Denisova, V. A.; Lukovnikova, L. A.
Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Molochnoi Promyshlennosti No. 49, 24 (1979) [Ru] [Sibirskii Filial VNIMI, USSR]

Over 200 strains of var ious spp. of lactic streptococci were examined for their capacity to inhibit contaminating microflora when used in tvorog starters. Some strains of *Streptococcus cremoris* exhibited strong antagonistic effect on *Escherichia coli* and enterococci, when used in starters for tvorog manufacture, they inhibited the growth of both these contaminants and also heat-resistant lactobacilli so that the resultant tvorog had 7.5% lower acidity; they were also highly stable in commercial use. It is recommended that starters containing antagonistic *S. cremoris* strains with high acid-producing capacity be used in tvorog manufacture. FL

90

An ideal vehicle for *Lactobacillus acidophilus*.
Duthie, A. H.; Duthie, A. E.; Nilson, K. M.; Atherton, H. V.
Dairy Field 164 (11) 139–140 (1981) [En] [Univ. of Vermont, Burlington, Vermont 05401, USA]

The possibility of using ice cream as a carrier for *Lactobacillus acidophilus* was studied. In 2 trials, the *L. acidophilus* colonies decreased during the initial freezing of the mix from 12.9 and 8.9 to 8.9 and 4.8 million/g, resp., the levels then fluctuating only slightly during storage of hard ice cream, the survival rate being greater than the recommended 2 million colonies/g on 28th day. In triangle tests no significant differences were found between the flavour of regular vanilla ice cream and that containing added *L. acidophilus* bacteria. It is considered that the *L. acidophilus* ice cream would be a new product for the dairy industry and a better carrier than milk. It would command a higher price and present no flavour or bacterial problems. FL

91

[Direct in-vat inoculation in the manufacture of Mamirolle cheese.]
Compte, B.; Guennec, S. le; Lablee, J.
Technique Laitiere No. 958, 13–17 (1981) [2 ref. Fr]

Mamirolle cheese, a washed, pressed, Saint-Paulin-type cheese, was successfully made on 30 occasions with 3 ICF direct-to-vat freeze-dried starters (A, B and C). The starters, which consisted of 2.6 units acidifying culture (*Streptococcus lactis* and *S. cremoris*) and 0.5 g aroma-producing culture (*S. lactis* subsp

diacetylactis)/100 l milk were added 20 min before rennetting. 1 unit of acidifying activity is defined as the amount of culture necessary to produce 150 mmol lactic acid in 4 h at 30°C in 10% reconstituted dried milk. DM, fat in DM after salting and DM at 16 days resp. were 50.2, 45.5 and 51.2% with starter A, 49.6, 46 and 50.4% with B and 50.3, 45.7 and 51.3% with C; organoleptic scores based on scales for Saint-Paulin cheese were 16.1 with A, 16.5 with B and 15.7 with C. The cheese could be made with only minor modifications to the manufacturing procedure using a 6-strain starter consisting of 85% acidifying and 15% aroma-producing bacteria. CDP

92

Incidence of streptococci and lactobacilli in Damietta cheese.

Fahmy, T. K.; Youssef, L. M.

Agricultural Research Review 56 (7) 149–152 (1978) [11 ref. En] [Dairy Microbiol. Dep., Anim. Production Res. Inst., Min. of Agric., Cairo, Egypt]

30 samples of market Damietta cheese were analysed for streptococci and lactobacilli. *Streptococcus lactis* was the most common *Streptococcus* sp., followed by *S. lactis* subsp. *diacetylactis*. Among the lactobacilli, *Lactobacillus casei* predominated, followed by *L. lactis* and small numbers of *L. bulgaricus*. JRR

93

Controlled fermentation of egg white by some *Lactobacillus* strains. (In *'Quality of eggs. Proceedings of the First European Symposium'* [see FSTA (1982) 14 8Q120].) [Lecture]

Mulder, R. W. A. W.

pp. 41–47 (1981) [7 ref. En] [Spelderholt Inst. for Poultry Res., Min. of Agric. & Fisheries, 7361 DA Beekbergen, Netherlands]

Studies were conducted on use of *Lactobacillus brevis*, *L. casei*, *L. fermentum* and *L. plantarum* for removal of glucose from egg white by fermentation. 2 fermentation temp. (25° and 30°C) were tested. The fermented product was then dried in an experimental plate drier, and functional properties were evaluated. Bacteriological quality was evaluated at various stages of processing, and effects of pH (7.5, 8.7, 9.9) and holding in a 'hot room' for 8 days at 56°C on survival of the *Lactobacillus* spp. were evaluated. Tables and graphs of results are given. The higher fermentation temp. reduces fermentation time; in the cases of *L. fermentum* and *L. plantarum* it adversely affects functional properties. *Lactobacillus* spp. fermentation gave better results than enzymic fermentation, and similar results to *Streptococcus faecalis* fermentation. Considerable decreases in *Lactobacillus* counts occurred during hot-room storage of the dried product. Overall, *L. fermentum* gave the best results when fermentation was at 25°C; *L. brevis* gave the best results at 30°C. AJDW

94

Production of Italian dry salami: effect of starter culture and chemical acidulation on staphylococcal growth in salami under commercial manufacturing conditions.

Metaxopoulos, J.; Genigeorgis, C.; Fanelli, M. J.; Franti, C.; Cosma, E.

Applied and Environmental Microbiology 42 (5) 863–871 (1981) [24 ref. En] [Dep. of Epidemiology & Preventive Med., Univ. of California, Davis, California 95616, USA]

The effect of starter culture and chemical acidulation on the growth and enterotoxigenesis of *Staphylococcus aureus* strain S-6 in Italian dry salami under commercial manufacturing conditions was studied. The experimental design included 2 levels of *S. aureus* (10^4 and 10^5/g), 3 levels of starter culture (0, 10^5, and 10^6/g), 3 levels of initial pH (pH_0) 6.1, 5.5, and 4.8), 2 manufacturing plants, and 3 replications. *S. aureus* growth in the salami was affected significantly ($P < 0.005$) by pH_0, initial levels of *S. aureus* ($staph_0$) and lactic acid bacteria (LAB_0), day of fermentation, and by the interactions of $pH_0 \times$ day, $pH_0 \times LAB_0$, $LAB_0 \times staph_0$, $pH_0 \times staph_0$, and $pH_0 \times$ location of fermentation. In general, the lower the pH_0 and the higher the LAB_0, the greater the inhibition of *S. aureus*. The LAB levels during the fermentation were affected significantly ($P < 0.005$) by pH_0, LAB_0, day of fermentation, location, $LAB_0 \times pH_0$, and $LAB_0 \times$ day. Derived regression equations related level of *S. aureus* and LAB at any day of fermentation to a number of microbiological and chemical variables. Close similarity of observed and predicted levels of *S. aureus* and LAB growth demonstrated the usefulness of the experimental approach in evaluating the safety of a process. No detectable enterotoxin or thermonuclease was found at any stage of processing even when *S. aureus* reached levels of 10^7/g of salami. AS

95

Low temperature lactic acid bacteria for meat fermentation. [Lecture]

Raccach, M.

Proceedings of the European Meeting of Meat Research Workers No. 26, Vol. II, N-23, pp. 335–338 (1980) [En] [Microlife Technics, PO Box 3917, Sarasota, Florida 33578, USA]

Studies were conducted on manufacture of Genoa, Pepperoni and summer sausages made with the *Pediococcus pentosaceus* starter culture Lactacel 75. Effects of phenolic antioxidants (BHA, BHT, TBHQ, at final concn. of 0.003%) and NaCl (3.0, 3.3, 3.6 or 3.9%) on fermentation of these sausages were studied, together with effects of Lactacel 75 on growth of *Staphylococcus aureus*. In APT broth, TBHQ gave 97% inhibition of acid formation by Lactacel 75, vs. 50.3% for BHT and little inhibition for BHA; inhibitory activity was less in meat systems than in APT broth. Inhibitory effect of NaCl was concn.-dependent, an increase of 45.6% in inhibitory activity being observed as NaCl concn. increased from 3.0 to 3.9%. Inhibitory effects of NaCl and antioxidants were not additive. Lactacel 75 inhibited growth of *Staph. aureus* and prevented enterotoxin formation. [See FSTA (1982) 14 8S1379.] AJDW

96

Comparative studies on the survivability and the activity of frozen and freeze-dried cultures of *L. plantarum.* [Lecture]
Yankov, Ya.; Brankova, R.; Raikov, G.
Proceedings of the European Meeting of Meat Research Workers No. 26, Vol. II, N-19, pp. 320–323 (1980) [12 ref. En] [Meat Tech. Res. Inst., Sofia, Bulgaria]

Studies were conducted on survival and activity of (i) freeze-dried and (ii) frozen (−30°C, or in liquid N) cultures of *Lactobacillus plantarum* strain L_4, intended for use as starters in meat product manufacture. The cultures were evaluated after up to 3 months storage. When dried skim-milk was used as a protective medium, survival was approx. 100% for both (i) and (ii), even after 3 months. Controls prepared using physiological saline showed poor survival (< 1% after 1 month, < 0.00024% after 3 months); survival of the liquid N-frozen cultures was better than that of (i) or those frozen at −30°C. Activity of (i) or (ii) cultures prepared using skim-milk protective medium was retained during storage (and increased slightly in some cases). [See FSTA (1982) 14 8S1379.] AJDW

97

Studies on the response of *Lactobacillus casei* to different folate monoglutamates.
Phillips, D. R.; Wright, A. J. A.
British Journal of Nutrition 47 (2) 183–189 (1982) [24 ref. En] [Food Res. Inst., Colney Lane, Norwich, Norfolk NR4 7UA, UK]

Under conditions normally used for measuring folic acid activity in foods, the response of *L. casei* to 5-methyl-tetrahydrofolic acid (5-MTHFA) is lower than that to folic acid (pteroylglutamic acid) or 5-formyl-tetrahydrofolic acid (5-FTHFA). Since 5-MTHFA is an important form of the vitamin in foods, microbiological assays using *L. casei* may underestimate the total folic acid activity present. Modifications to the assay procedure are described and include increasing the buffering capacity by addition of ascorbic acid to the standard solutions and assay medium at 1 g/l and adjusting the initial pH of the medium to 6.2. Under these conditions 5-MTHFA has the same growth effect on *L. casei* as folic acid and 5-FTHFA. MEG

98

Control of malolactic fermentation in wine. II. Isolation and characterization of a new malolactic organism.
Silver, J.; Leighton, T.
American Journal of Enology and Viticulture 32 (1) 64–72 (1981) [23 ref. En] [Biologicals, 20 Victoria Street, Toronto, Canada M5C 2NB]

Several natural isolates of lactic acid bacteria were made from wines which were undergoing spontaneous malolactic fermentation. These organisms were screened for: rapid growth, rapid metabolism of malic acid, and optimal growth response to pH, alcohol, SO_2, fumaric acid, and temp. Of the natural isolates studied, a strain designated B44.40 showed the greatest potential for rapid growth, efficient metabolism of malate, and greatest tolerences to variations of pH and temp. When B44.40 was compared to *Leuconostoc oenos* strains ML-34 and PSU-1, it was found to grow more rapidly in synthetic media and to metabolize organic substrates present in wine such as malate and glucose at a more rapid rate than either ML-34 or PSU-1. B44.40, ML-34 and PSU-1 showed similar tolerances to alcohol and fumaric acid. B44.40 showed less tolerance to SO_2 than either ML-34 or PSU-1. AS

99

[Effect of 'Vitalakt' humanized milk formulas with different carbohydrate compositions on development of *Bifidobacterium* in the intestine of infants.]
Shvedova, L. V.
Voprosy Pitaniya No. 3, 14–17 (1981) [8 ref. Ru, en] [Ukrainskii Nauchno-issled. Inst. Myasnoi & Molochnoi Promyshlennosti, Kiev, USSR]

Vitalakt DM humanized milk formula, developed in the author's Institute, and 3 modifications (Vitalakt I, Vitalakt II and Vitalakt III) were tested. The reconstituted formulas contained resp.: 5.7, 5.7, 7.0 and 6.0% lactose; 2.0, 1.0, 0.65 and 0% sucrose; 0.5, 1.5, 0.65 and 1.2% dextromaltose; 0, 0, 0, and 1% lactulose; and 0, 0, 0, and 1.8% starch. A total of 67 infants, aged 5 wk–5.5 months, received for 2 wk–3.5 months 1 of the 4 Vitalakt formulas or 'Malysh' milk formula or human milk. Total % incidences of *Bifidobacterium* in faeces of the 6 groups of infants were resp. 54.1, 81.6, 87.5, 80.3, 23.0 and 100. Infants given Vitalakt II showed intestinal disturbances ascribed to high content of lactose. Vitalakt I and Vitalakt III were used as a basis for development of 'enriched Vitalakt' which is recommended for feeding to premature or sick infants. SKK

100

[Study of *Streptococcus lactis* strains of different acid-producing activities, as starters for Manchego-type cheese.]
Nunez, M.; Martinez Moreno, J. L.; Medina, A. L.
Anales del Instituto Nacional de Investigaciones Agrarias, Ganadera No. 12, 65–72 (1981) [12 ref. Es, en] [Dep. de Bioquimica y Microbiol., CRIDA 06 (Tajo) INIA, Carretera de la Coruna, Km. 7, Apartado 8 111, Madrid, Spain]

34 strains of *Streptococcus lactis*, isolated from farmhouse Manchego cheese made from raw ewes' milk, were tested for use as starters in manufacture of Manchego-type cheese from a mixture of pasteurized cows' and ewes' milk. Total viable count, counts of coliforms, lactobacilli, leuconostocs and coagulase-positive staphylococci, DM and pH were determined after 7 and 30 days ripening, and correlated with acid-producing ability of the *S. lactis* strains. Low pH and high total bacterial and streptococcal counts were correlated with high acid production; counts of coliforms tended to be higher in cheeses with higher pH. Lactobacilli and leuconostocs were only present in small numbers under the test conditions, and staphylococci were not detected. Strains producing > 0.25% lactic acid were considered most suitable for use as starters. JMa

101

[Method for studying interrelationships between strains in cheese starters.]
Gudkov, A. V.; Dokukin, V. M.; Perfil'ev, G. D.
No. 30, 38–41, 90 (1979) [Ru] [VNIIMSP, Uglich, USSR]

Soviet cheese starters generally incorporate strains of *Streptococcus lactis*, *S. cremoris* and *S. lactis* subsp. *diacetylactis*. Assessment of strain dominance is necessary in selection of stable strain mixtures. The preferred method for studying survival of individual strains in skim milk consists of culturing starter dilutions on agar in the presence or absence of indicator phages and determining the numbers of cells susceptible to a given phage from colony count difference. It was found that in a mixture of 722_3, 710_4 and 393_8 strains of *S. lactis*, the 1st 2 remained relatively stable in ≥ 10 subcultures, but that the 3rd virtually disappeared, so that its inclusion with the other 2 strains in a starter would be useless. Similar study of *S. cremoris* strains 93, 613 and 13 showed that they formed a stable combination. Among a mixture of 361_6, 563, 352_1, 1064 and 695_{11} strains of *S. lactis* subsp. *diacetylactis*, 695_{11} already achieved absolute dominance in the 5th subculture, strain 1064 was absent from the 10th subculture, and the remaining 3 strains for accounted only 5–8% of the count. The phage typing procedure is described in detail. SKK

102

Accelerated fermentation of milk by nitrosoguanidine induced mutants of lactobacilii.
Singh, J.; Chopra, A. K.
Journal of Food Science 47 (3) 1027, 1029 (1982) [En]
[Dairy Bact. Div., Nat. Dairy Res. Inst., Karnal (Haryana), India]

Selected nitrosoguanidine (NTG) mutants of *Lactobacillus bulgaricus* and *L. casei* produced appreciably higher acidities and a noticeable increase in proteolytic activity as compared to the parent cultures. Combination of these NTG-induced mutants with *Streptococcus lactis* and *S. cremoris* showed enhancement in the biochemical performance, thereby exploring the possibility of utilizing these variants in the manufacture of milk products. IFT

103

Tear grass fermentation product and process.
Hagiwara, Y. (Japan Natural Food Co. Ltd.)
United States Patent 4 298 620 (1981) [En]

In a typical example, water extract of tear grass (*Coix lachryma-jobi Linn.* var. mayhen Stapf) is mixed with milk, whey or other milk products and fermented with *Lactobacillus bulgaricus* to form a lactic beverage. EJM

104

Evaluation of lactic acid bacteria for extending the shelf life of shrimp.
Moon, N. J.; Beuchat, L. R.; Kinkaid, D. T.; Hays, E. R.
Journal of Food Science 47 (3) 897–900 (1982) [En]
[Dep. of Food Sci., Univ. of Georgia Agric. Exp. Sta., Experiment, Georgia 30212, USA]

44 strains of lactic acid bacteria (LAB) were tested fo inhibitory activity against 3 strains of *Pseudomonas, Vibrio parahaemolyticus* and naturally occurring microflora on fresh deheaded shrimp. Cell-free filtrates and cell suspensions of 6 strains of LAB were inhibitory to growth of *Pseudomonas* on agar lawns. Degree of inhibition depended upon medium used for cultivation of LAB prior to testing, and presence or absence of LAB cells on the test lawns. Filtrates were generally more inhibitory than cell suspensions. Certain strains of *Streptococcus lactis* and *Lactobacillus casei* inhibited rate of growth of *Pseudomonas* in broth culture. Neither LAB retarded development of microflora of iced shrimp stored at 5° and 12°C. *L. casei* may have had an inhibitory effect on rate of growth of *V. parahaemolyticus* on iced shrimp. Overall, data indicate that treatment of fresh shrimp with LAB to extend shelf life during storage on ice may not be practical. IFT

105

Method and starter compositions for the growth of acid producing bacteria and bacteriai composition produced thereby.
Sandine, W. E.; Ayres, J. W. (United States of Americ Oregon State University)
United States Patent 4 282 255 (1981) [En]

The incorporation of 0.1–10 parts (by wt.) of an insoluble or insolubilized, solid neutralizing agent (e.g tablets of sodium carbonate, containing 1% magnesiu stearate as a lubricant and sprayed with a mixture of 50% methyl cellulose and 50% ethyl cellulose) per 100 parts of growth medium containing at least 1×10^7 bacterial cells per ml. is claimed to improve the stabilit of the cultures on storage. The method is particularly suitable for bulk starter media for lactic acid bacteria and which may be held at ambient room temp. for at least 24 h. EJM

106

Production of L-lactic acid with immobilized *Lactobacilius delbrueckii*.
Stenroos, S.-L.; Linko, Y. Y.; Linko, P.
Biotechnology Letters 4 (3) 159–164 (1982) [15 ref. I [Dep. of Chem., Helsinki Univ. of Tech., SF-02150 Espoo 15, Finland]

Living *Lactobacillus delbrueckii* cells were entrap in calcium alginate gel beads and employed both in recycled batch and continuous column reactors to produce L-lactic acid from glucose. The substrate contained 1% (w/v) yeast extract as nutrient and 4.8 (w/v) solid $CaCO_3$ as buffer. The max. lactic acid yiel obtained was 97%, of which <90% was L-lactic acic The biocatalyst activity half-life in continuous opera was about 100 days, only about 10% of the activity v lost during intermittent storage of the bioreactor at +7°C for about 5 months. AS

107

Purification and properties of a malolactic enzyme from a strain of *Leuconostoc mesenteroides* isolated from grapes.

Lonvaud-Funel, A.; Saad, A. M. S. de

Applied and Environmental Microbiology 43 (2) 357–361 (1982) [11 ref. En] [Inst. d'Oenologie, Univ. de Bordeaux II, 33405 Talence, France]

An enzymic complex able to transform L-malate to L-lactate was obtained from a *Leuconostoc mesenteroides* strain isolated from grapes. The mol. wt. was about 235 000, the isoelectric point was at pH 4.35, and the optimal pH for activity was 5.75. The malolactic activity followed a sequential pattern concerning the involved substrates. At pH values substantially different from the optimum, a positive cooperativity between malate molecules was observed. Oxamate, fructose-1,6-diphosphate, and L-lactate acted as noncompetitive inhibitors, whereas succinate, citrate, and tartrate isomers produced a competitive inhibition. AS

108

Yoghurt starters in skim milks. I. Acid and flavour production and proteolytic activity by yoghurt starters.

Jasjit Singh; Sharma, D. K.

Cultured Dairy Products Journal 17 (1) 22, 24–25 (1982) [8 ref. En] [Dairy Bacteriol. Div., Nat. Dairy Res. Inst., Karnal-132001, India]

4 strains of *Lactobacillus bulgaricus* (RTS, W, Y6 and 1373) were each paired with each of 2 strains of *Streptococcus thermophilus* (HST and W) and incubated in fresh skim milk at 37°C. *L. bulgaricus* RTS + *S. thermophilus* HST, which showed highest titratable acidity, volatile acidity and proteolytic activity for their respective species when grown alone, also showed highest values when grown together. Values at 18 h for this combination were: titratable acidity, 1.3%; volatile acidity, 6.05 ml 0.1N NaOH/50 g curd; acetaldehyde production, 23 p.p.m.; and proteolytic activity, 0.31 mg tyrosine liberated/g curd; these were all higher than the added values of the 2 strains grown alone. Corresponding values for the other combinations of strains were 0.75–1.15% lactic acid, 4.0–5.4 ml 0.1N NaOH, 19.48–22.2 p.p.m. acetaldehyde, and 0.22–0.27 mg tyrosine/g curd. CDP

109

[Effect of visible light and supplementary addition of bivalent ions on lactic acid bacteria used in cheesemaking.]

Grigorov, N. I.; Chebotarev, L. N.

Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 30, 62–65, 92 (1979) [4 ref. Ru] [VNIIMSP, Uglich, USSR]

Streptococcus cremoris Mn^{4}_{5} and *Leuconostoc cremoris* 199_{12} were cultured in pancreatin-hydrolysed milk with or without addition of 4 mg% Mn^{2+}, 21 mg% Zn^{2+}, or 1.4 mg% Co^{2+}, separately or together, in the presence or absence of visible light. Data on colony counts and lactic acid, acetic acid and ethanol production/million cells are given. Addition of Mn and Mg ions alone or together increased 4 × the max. colony count of *L. cremoris* but had no effect on *S. cremoris*. Addition of Mn^{2+} and Mg^{2+} increased lactate formation by *S. cremoris*. Light had no significant effect on multiplication of either microorganism. SKK

110

[Formation of hydrogen peroxide by lactic acid bacteria used in cheesemaking.]

Perfil'ev, G. D.; Gudkov, A. V.

Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 30, 35–37, 90 (1979) [Ru] [VNIIMSP, Uglich, USSR]

Industrial strains of *Streptococcus, Leuconostoc* and *Lactobacillus*, isolated from cheese and silage, were studied. Formation of H_2O_2 by open test-tube cultures of the strains in skim milk at 30° or 37°C was measured. Absorption of O_2 and formation of H_2O_2 was common to all species and strains. H_2O_2 breakdown occurred at the end of the experimental and beginning of the stationary growth phases; the peroxidase breakdown pathway was observed in cultures of streptococci and leuconostocs, and the peroxidase or catalase pathways (depending on strain) were observed in *Lactobacillus plantarum*. SKK

111.

[Study of some properties of lactic streptococci used in cheesemaking.]

Belova, G. A.; Medvedeva, Z. P.; Kornelyuk, A. N.; Trofimova, T. I.

Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 30, 26–30, 89–90 (1979) [6 ref. Ru] [VNIIMSP, Uglich, USSR]

To select fresh strains for preparing a bacterial starter, 457 strains of mesophilic lactic streptococci consisting of 165 strains of (i) *Streptococcus lactis*, 96 of (ii) *S. cremoris*, 104 of (iii) *S. lactis* subsp. *diacetylactis* active, 76 of (iv) *S. lactis* subsp. *diacetylactis* weak, and 16 of (v) *Leuconostoc dextranicum* were examined for lipolytic activity, formation of bitter polypeptides in milk in the presence of rennet, and breakdown of bitter polypeptides in milk in the presence of mesenterin. Descending orders of activity were: lipolysis, (ii) > (iv) > (iii) > (v) > (i); formation of bitter polypeptides, (i) > (ii) = (iii) > (iv) > (v); and breakdown of bitter polypeptides, (iv) > (iii) > (ii) > (i) > (v). SKK

112

[Effect of some synthetic detergents on bacteriophages of mesophilic lactic streptococci.]

Gudkov, A. V.; Dokukin, V. M.; Molochnikov, V. V.; Pavlova, N. V.

Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti No. 30, 53–56, 91–92 (1979) [1 ref. Ru] [VNIIMSP, Uglich, USSR]

A *Streptococcus lactis* bacteriophage with a wide spectrum of lytic activity and relatively high resistance to unfavourable environmental factors was added at 1.5–9.1 × 10^7 particles/ml to solutions of the detergents

Vimol, Trias, or Moitar of 0.3, 0.5, 0.75, 1.00, 1.25 or 1.50% concn. The solutions were then held at 40°, 50°, 60°, 70° or 80°C for 2, 3 or 10 min, and phage titres determined. Vimol and Trias solutions at 05–1.0% are recommended for phage destruction by 2-min contact at 60–70°C, or by 10-min contact at 45–50°C. Moitar was less effective. SKK

113

Economical bulk lactic culture concentrates for manufacturing American style cheese.
Hong, G. L.
Dissertation Abstracts International, B 42 (5) 1807: Order no. 8121377 (1981) [En] [Utah State Univ., Logan, Utah 84321, USA]

Cultures grown with pH and temp. control in a whey-based phage inhibitory medium, containing 0.5% autolysed yeast but no trace minerals, produced twice as many colony-forming units/ml but slightly less acid production/cell, compared with cultures grown in a more expensive commercial phage inhibitory medium. 2 simple tests were developed: starter activity was assessed by incubating 3% bulk starter in cheese milk for 1.5 h at 30°C; and presence of phage was detected by incubating filter-sterilized whey + lactic strain and lactic strain alone in reconstituted dried skim milk + bromocresol purple, and noting colour difference between the 2 tubes after 4–6 h at 30°C. Use of the whey-based medium for starter propagation markedly increased the amount of cheese having an acceptable pH at 24 h. CDP

114

[Use of starters for quarg and fresh cheese.] Die Anwendung von Quark- und Frischkäse-Kulturen.
Pallasdies, K.
Deutsche Milchwirtschaft 32 (37) 1372–1373 (1981) [De]

This paper describes the proprietary 'Visbyvac' (freeze-dried) and 'Fermovac' (conc. deep-frozen) starter cultures manufactured by Wiesby Laboratories, and procedures for their use in industrial production of quarg and fresh cheese. A culture of *Leuconostoc cremoris* 08 developed by Wiesby for enhancing the aroma of quarg is also mentioned. SKK

115

Studies on lactic acid fermentation of whole egg. . Study on sterilization method of whole egg and fermentation of sterilized whole egg by lactic acid bacteria.]
Katamine, S.; Sekimoto, K.; Mochida, Y.; Shisai, Y.; Furukawa, N.; Yamanaka, Y.
Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi] 24 9) 472–478 (1977) [18 ref. Ja, en] [Res. Cent., Nihon Nosan Kogyo Co. Ltd., Daimura-cho, Midori-ku, Yokohama, Japan]

Liquid whole egg was completely sterilized by 2 to successive pasteurizations at 58°C for 30 min, holding between pasteurizations at 37°C for 2–3 h. Several *Lactobacillus and Streptococcus* strains were tested for growth on the egg; the main acids produced were lactic, with small amounts of pyruvic and acetic acids later in the fermentation. [From En summ.] JRR

116

Method and bacterial compositions for fermenting meats.
Raccach, M. (Microlife Technics Inc.)
United States Patent 4 303 679 (1981) [En]

Method and bacterial compositions are described for producing fermented meat by generating lactic acid using selected cultures of *Pediococcus pentosaceus* which have unique low temp. meat fermentation characteristics. The preferred *P. pentosaceus* is NRRL-B-11,465 which is unusually rapid in lowering the pH at low meat temp. A stimulatory edible metal salt, preferably a Mn salt, is included in the meat with the *P. pentosaceus* to reduce or eliminate preservative inhibition and/or to accelerate growth at meat temp. 15.6°–26.7°C. Preservatives to prevent spoilage and rancidity can be used in the meat and can include hydroxyaryl antioxidants, other meat preservatives, particularly NaCl, which severely inhibit NRRL-B-11,465 at low meat temp. (15.6°–26.7°C). *P. pentosaceus* compositions containing the stimulatory metal salt are also described. The method and compositions, particularly with a Mn salt, can produce a pH approx. <5.0 in <30 h at smoke-house temp. (>15.6°C), and at initial meat temp. of 4.4°–10°C with standard casing diam. (approx. ≤ 100 mm). The method is particularly useful for making dry and semi-dry sausage and for nitrite reduction in meats. AS

117

Ultrastructures of bacteriophages active against *Streptococcus thermophilus, Lactobacillus bulgaricus, Lactobacillus lactis* and *Lactobacillus helveticus.*
Reinbold, G. W.; Reddy, M. S.; Hammond, E. G.
Journal of Food Protection 45 (2) 119–124, 126 (1982) [18 ref. En] [Dep. of Food Tech., Iowa State Univ., Ames, Iowa 50011, USA]

118

Interactions of *Lactobacillus* and *Propionibacterium* in mixed culture.
Parker, J. A.; Moon, N. J.
Journal of Food Protection 45 (4) 326–330 (1982) [11 ref. En] [Food Sci. Dep., Univ. of Georgia, Experiment, Georgia 30212, USA]

4 spp. of *Lactobacillus* (*L. acidophilus, L. casei, L. delbrueckii* and *L. bulgaricus*) were paired with 4 spp. of *Propionibacterium* (*P. pentosaceum, P. shermanii, P. acidipropionici* and *P. freudenreichii*) and were grown in pure and mixed culture to assess associative interactions. A defined synthetic medium was used with glucose as energy source and casamino acids as N source. 15 of the 16 paired cultures had less growth, acid and CO_2 production than pure culture controls. In some pairs, both cultures were inhibited by mixed cultivation while in others only the *Propionibacterium* was

inhibited. In several mixtures, the *Lactobacillus* culture was apparently unaffected by mixed culturing. In *P. shermanii* and *L. acidophilus* mixed culture, a beneficial synergistic effect on growth, CO_2 and volatile and nonvolatile acid production was observed. Lactate accumulation was low in the mixed culture medium; it was apparently used as an energy source and resulted in increased CO_2 and acid production by *P. shermanii*. AS

119

[Formation of L- or D-lactate on malo-lactic fermentation of red wine.]

Hara, S.; Mizuno, A.

Hakkokogaku Kaishi 59 (1) 17–22 (1981) [13 ref. Ja, en] [Nat. Res. Inst. of Brewing, 2-6-30 Takinogawa, Kita-ku, Tokyo 114, Japan]

Most lactate formed by malo-lactic fermentation is L(+)-lactate, but a *Leuconostoc mesenteroides* strain producing the D-isomer was isolated. Production of L- or D-lactate was examined in this organism (MLB-S-6 strain) and in *L. mesenteroides* IAM 1233, *Lactobacillus casei* IAM 1118, *Lact. plantarum* IAM 1216, *Lact. arabinosus* IAM 1041, and *Streptococcus lactis* RIB 806. All of the tested strains converted L-malate to L-lactate at pH 3.2–7.0; optimum pH was 4–5 and reaction was not inhibited by semicarbazide. D-lactate and acetate were produced at pH >7.0. *L. mesenteroides* also converted pyruvate to D-lactate and acetate at pH 5–7, optimal pH 6.0, and reaction was completely inhibited by semicarbazide. A cell-free *L. mesenteroides* extract converted L-malate to L-lactate in the presence of nicotinamide adenine dinucleotide, Mn^{2+} and semicarbazide. Implications of these results are considered. [From En summ.] LH

120

[Decomposition of malic acid in red wine by immobilized microbial cells.]

Totsuka, A.; Hara, S.

Hakkokogaku Kaishi 59 (3) 231–237 (1981) [16 ref. Ja, en] [Nat. Res. Inst. of Brewing, 2-6-30 Takinogawa, Kita-ku, Tokyo 114, Japan]

Schizosaccharomyces pombe 007 and *Leuconostoc mesenteroides* IAM 1233 were immobilized on agar or calcium alginate gels at 10^5–10^6/cm^3 gel, and incubated for 24–48 h at 25°C (in malt extract or grape juice for *S. pombe*, and in mandarin orange/apple juice for *L. mesenteroides)* to increase cell density to 10^8–10^9/cm^3. The malate fermenting ability of these organisms was more stable under adverse pH, alcohol concn. and temp. conditions when they were immobilized. [From En summ.] LH

121

Comparison of procedures for isolation of malolactic bacteria from wine.

Westhuizen, L. M. van der; Agenbach, W. A.; Loos, M. A.; Schoombee, N. F.

American Journal of Enology and Viticulture 32 (2) 168–170 (1981) [13 ref. En] [Oenological & Viticultural Res. Inst., Private Bag X5026, Stellenbosch 7600, South Africa]

Malolactic bacteria were isolated from wine by direct streaking on modified Rogosa agar plates followed by aerobic incubation or incubation in a high CO_2 atm. or enrichment in modified Rogosa broth before streaking and aerobic incubation (designated (i), (ii) and (iii), resp.). The incubation temp. was 30°C throughout. More cocci were isolated with (i) and (ii) than with (iii). Preliminary identification tests indicated that 41 lactobacilli, 34 *Leuconostoc* spp. and 15 pediococci were isolated by (i) and (ii) vs. 45 lactobacilli, 2 *Leuconostoc* spp. and 1 pediococcus by (iii). (ii) seemed most suitable for the isolation of *Leuconostoc* spp. AS

122

[Ability of *Lactobacillus delbrueckii* to adapt to low culture temperatures.]

Ostrovskaya, L. K.

Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya No. 1, 77–81 (1981) [12 ref. Ru] [Dzhambulskii Tekh. Inst. Legkoi i Pishchevoi Promyshlennosti, Dzhambul, USSR]

In connection with the use of liquid yeasts for wheat dough fermentation in the bakery industry, the possibility of culturing *L. delbrueckii* at a low temp. by choosing the most favourable composition of growth medium (according to contents of sugars and amino N) was studied. *L. delbrueckii* grew at low temp. on media with high content of amino N, but could not be cultivated at ≤40°C on flour hydrolysates, as the high content of reducing sugars in the media resulted in contamination by yeasts. Cultivation of *L. delbrueckii* on media consisting of a mixture of yeast biomass hydrolysates and flour enabled culture temp. to be reduced to 30–35°C, and produced inocula of high nutritional value. STI

123

[Complex bacterial-yeast preparation for breadmaking.]

Latfullina, R. Sh.

Trudy Instituta Mikrobiologii i Virusologii 25, 145–152 (1979) [13 ref. Ru]

A culture medium was developed for production of a bacterial/yeast preparation consisting of *Schizosaccharomyces pombe* and *Streptococcus lactis*. Symbiosis of the two microbes is observed only if a certain ratio of the cultures is present. There is a hazard of yeast lysis due to an increased (30–100 mg%) level of hydrolytic enzymes, whereby faster utilization of the nutrient takes place. For baking applications a dried yeast preparation is recommended; it improves stability of leavened dough and nutritive value of bread. Optimal composition of the cultivating medium is given. STI

124

[Preliminary study of the behaviour of mixed mesophilic lactic cultures in goats' milk.]

Haverbeck, J. C.; Cartes, M.; Horzella, R. M.; Henriquez, O.

Alimentos 6 (3) 5–11 (1981) [21 ref. Es, en] [Centro Tech. de la Leche, Valdivia, Chile]

Goats' milk and reconstituted cows' skim milk were pasteurized for 30 min at 85°C, inoculated at 1% with a mixed culture of *Streptococcus cremoris, S. lactis, S. lactis* subsp. *diacetylactis* and *Leuconostoc cremoris*, and incubated for 15–16 h at 21 ± 0.5°C. The activity of these cultures was tested by inoculating them into fresh samples of goats' and cows' milk and measuring the acidity (°T) developed in 6 h at 30°C. Both in goats' and in cows' milk, the logarithmic mean of the total bacterial count in 5 propagations was 7.1×10^8. In goats' milk, however, the mean count of the flavour-producing bacteria *S. lactis* subsp. *diacetylactis* and *L. cremoris* was significantly higher than in cows' milk (6×10^7 vs. 9.6×10^6). Mean acidity of the culture was 75.2 and 72°T in 5 propagations in goats' and cows' milk resp. ADL

125

[Inhibition of R-plasmids transmission by lactobacillus.]
Lafont, J.; Lafont, P.
Cahiers de Nutrition et de Dietetique 16 (4) II–IV (1981) [10 ref. Fr, en] [INSERM-SCR8, Microbiol. appliquee a l'Alimentation et a la Nutr., 44, Chemin de Ronde, 78110 Le Vesinet, France]

Extracts of pure cultures of *Lactobacillus bulgaricus, L. casei, L. helveticus* and *L. fermentum*, and of 3 strains isolated from yoghurt, were prepared by treatment of a disintegrated cell with a solution containing 0.005M acetic acid and 0.005M lactic acid. After neutralization, the extracts were added to a suspension of *Escherichia coli* K12 (sensitive to streptomycin) at the time of mixing with bacteria donating streptomycin-resistant plasmids (*E. coli* 9 or 103, *Citrobacter intermedium* or *Enterobacter aerogenes*). All the lactobacillus extracts had an inhibitory effect on the transfer of R-plasmids; this inhibitory effect was destroyed by heating the extracts at 65°C for 3 min or at 80°C for 1 min. The inhibitory factor was also present in yoghurt. MEG

126

Growth of thermoresistant streptococci in cheese milk pasteurizers. III. Specific bacterial flora and its effect on cheese quality.
Driessen, F. M.; Bouman, S.
Nordeuropaeisk Mejeri-Tidsskrift 47 (5) 126–131 (1981) [7 ref. En, Da, De] [Netherlands Inst. for Dairy Res., Ede, Netherlands]

Strains of heat-resistant streptococci, isolated from cheese milk or cheese, had the identification characteristics of *Streptococcus thermophilus* except that they were able to grow in the presence of 3% NaCl. Experimental cheeses were manufactured using milk heavily contaminated with these heat-resistant organisms. Cheeses were graded after 4 wk. When less starter was used (0.1 vs. 0.8%) an unclean yeasty taste and open texture was observed; this was due to excessive production of CO_2, although these streptococci could not ferment citric acid. The intensity of these defects was reduced when a normal amount of starter was used with the same amount of contaminating organisms. The suitability of TGV agar or Plate Count Agar + 5% skim milk for counting these streptococci in unheated and pasteurized pure cultures and in samples of cheese milk and cheese was examined. Recommended procedures are given for enumeration of streptococci in raw, thermized, pasteurized or cheese milks and in cheese. [See FSTA (1981) 13 4P641 & 4P643 for parts I and II.] MMM

127

[Method for making cultured milk products with *Bifidobacterium*.]
Mudai, K.; Umada, K.; Nakajima, K.; Onoue, E. (KK Yakult Honsha)
Japanese Examined Patent 5 704 291 (1982) [Ja]

In making cultured milk with *Bifidobacterium bifidun* YIT 4002 or YIT 4005, sorbitol is added at 0.1–2.0 M to the initial medium or to the culture. This is claimed to decrease the reduction in cell numbers during short-term culture. BWH

128

[Method for making cultured milk products with *Bifidobacterium*.]
Mudai, K.; Umada, K.; Amamoto, M.; Noda, K.; Iijima, T. (KK Yakult Honsha)
Japanese Examined Patent 5 704 290 (1982) [Ja]

In making cultured milk products with *Bifidobacterium* sp. as the starter, sucrose and/or sorbitol are added to the medium at 0.15–0.7 M to ensure satisfactory cell numbers of bifidobacteria. BWH

129

Presence and activity of psychrotrophic microorganisms in milk and dairy products: a review.
[Review]
Cousin, M. A.
Journal of Food Protection 45 (2) 172–207 (1982) [385 ref. En] [Anim. Sci. Dep. & Food Sci. Inst., Purdue Univ., W. Lafayette, Indiana 47907, USA]

The presence and metabolic activity of psychrotrophic microorganisms in milk and dairy products are reviewed. Problems involved in adequately defining the microorganisms and temp. of growth are discussed. Sources and incidences of psychrotrophs in milk and dairy products and methods to control these microorganisms are presented. Methods ranging from simple plate counting techniques to detection of metabolites produced by the psychrotrophs are reviewed. Alterations of protein, lipid and carbohydrate fractions of milk and their effects on the keeping quality of milk and dairy products are discussed, and additional research areas are suggested. AS

130

Growth of toxigenic and nontoxigenic aspergilli and penicillia at different temperatures and in the presence of lactic acid bacteria.
El-Gendy, M.; Marth, E. H.
Archiv für Lebensmittelhygiene 31 (6) 192–195 (1980) [14 ref. En, de] [Dep. of Food Sci., Univ. of Wisconsin, Madison, Wisconsin 53706, USA]

18 strains of toxigenic and non-toxigenic *Aspergillus flavus, A. parasiticus* and 1 of *A. ochraceus* and 12 species or strains of *Penicillium* were incubated at 5°–28°C. Tabulated results showed that none of the aspergilli grew at <15°C, and growth after 2 wk at 15°C was less than after 1 wk at 20°C. All but 1 of the penicillia had grown after 2 wk at 7°C, with max. growth for most apparent after 2 wk at 15°C. Addition of *Streptococcus lactis* and *Lactobacillus casei* inhibited the growth of all aspergilli and 8 of the 12 penicillia even after 2 wk incubation at 15°C. RM

131

Classification of citrate fermenting lactobacilli isolated from lamb stomach, sheep milk and Pecorino Romano cheese.
Dellaglio, F.; Arrizza, S.; Ledda, A.
Zentralblatt für Bakteriologie, Mikrobiologie und Hygiene, 1C 2 (4) 349–356 (1981) [17 ref. En] [Istituto di Microbiol. Agraria e Tecnica, Univ. Cattolica del Sacro Cuore, 29100 Piacenza, Italy]

330 strains of citrate-fermenting lactobacilli were isolated from lamb stomach, lamb rennet paste, ewes' milk and Pecorino Romano cheese. 52 representative strains belonging to 4 physiological groups were examined for their genetic relationship using the DNA-DNA hybridization test. Most of the heterofermentative strains, isolated from lamb stomach and lamb rennet paste, belonged to the *Lactobacillus reuteri* group, while the others were found to be related to *L. fermentum*. The homofermentative citrate-fermenting lactobacilli, isolated mainly from Pecorino Romano cheese, shared high levels of genetic homology with *L. plantarum*. Only 1 strain was similar to *L. casei*. AS

132

Fermentation of blanched-bean soymilk with lactic cultures.
Patel, A. A.; Gupta, S. K.
Journal of Food Protection 45 (7) 620–623 (1982) [16 ref. en] [Div. of Dairy Tech., Nat. Dairy Res. Inst., Karnal 132001, India]

Soy milk prepared from dehulled, blanched soybeans ground in water or in neutralized citric acid whey from channa-making, was fermented for 14–16 h with *Streptococcus lactis* subsp. *diacetylactis* or a lactic culture (LF-40) at 30°C, or with *S. thermophilus* or *Lactobacillus bulgaricus* at 37°C. Sensory evaluations were carried out by a trained panel. Enrichment of soy milk with 0.5% lactose enhanced acid production, especially with LF-40, and improved flavour and texture. Acid production by LF-40 or *S. lactis* subsp. *diacetylactis* did not differ significantly in lactose-fortified vs. whey-soy milk, but was greater in whey-soy milk when using *S. thermophilus* or *L. bulgaricus*. Flavour of the whey-soy product scored higher than that of the plain soy milk with all 4 cultures. JMa

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[Screening for mutants of *Lactobacillus sake* and *Saccharomyces sake* Kyokai No. 7 resistant to the antibiotic substance F 16-2.]
Tsukamoto, K.; Hayashida, S.
Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi] 55 (12) 1213–1216 (1981) [9 ref. Ja, en] [Chikushi Jogakuen Junior Coll., Fukuoka 818-01, Japan]

From cultures in rice koji broth, 3 natural mutants of *Lactobacillus sake* IFO 3541, 3 strains of *Saccharomyces sake* Kyokai No. 7 and 4 strains of other brewery yeasts were isolated which grew in the presence of F 16-2 (an antibiotic substance from *Bacillus subtilis* 16-2) at 40 units/ml; 9 resistant yeast strains were isolated from rice koji. Neither *S. sake* nor *L. sake* mutant strains differed in their morphological or basic biochemical properties from the parent strains; the F 16-2 resistance of the mutant strains was not diminished by transfer from the koji broth to agar medium. When *S. sake* mutant 7-2 was cultured in koji extract with F 16-2 at 40 U/ml there was no delay in yeast growth, and F 16-2 activity did not diminish significantly during 7 days culture; in similar culture growth of the parent strain was delayed for 2 days, and F 16-2 activity dropped to zero within 3 days. In standard moromi without F 16-2 both the parent *S. sake* Kyokai No. 7 and mutant 7-2 grew normally and produced an alcohol concn. of 20%; in moromi with F 16-2 added, the fermentation with the parent strain finished prematurely at alcohol 15% whereas fermentation with mutant 7-2 proceeded normally. CIH

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[Enzymic determination of substrates in milk product analysis.] Enzymatische Substratbestimmungen bei der Untersuchung von Milchprodukten.
Henniger, G.
Deutsche Milchwirtschaft 32 (32) 1189–1192 (1981) [De]

The bases and scope of enzymic detn. of nutrients in a variety of food products are outlined. Enzymic detn. of lactose and of D- and L-lactic acid in milk products are also discussed. General guidelines on reagents and procedures are given. SKK

135

Influence of lactic acid starter bacteria on enteropathogenic *Escherichia coli* in ultrafiltration prepared Camembert cheese.
Rash, K. E.; Kosikowski, F. V.
Journal of Dairy Science 65 (4) 537–543 (1982) [24 ref. En] [Dep. of Food Sci., Cornell Univ., Ithaca, New York 14853, USA]

Camembert cheeses were made from 20% protein retentates prepared by ultrafiltration of pasteurized skim milk. The retentate was mixed with plastic cream (67% fat) to give a precheese mix which was pasteurized at 65°C for 30 min before addition of 2% starter and *Penicillium candidum* spores and *Escherichia coli* 0124 at 10^3–10^4 colony forming units/g. Single strain starters (*Streptococcus cremoris, S. lactis, Lactobacillus bulgaricus, L. casei* or *L. helveticus*), or mixed strain starters (*S. cremoris* with *L. bulgaricus, L. helveticus* or with *S. lactis* subsp. *diacetylactis*, or

diacetylactis) were used. During cheese manufacture, survival of *E. coli* in the presence of the different starters increased in the order: *S. cremoris* < *L. helveticus* < *S. lactis* < *L. casei* < *L. bulgaricus*. The combined *S. cremoris* + *L. helveticus* starter was the most effective in reducing growth of *E. coli* during cheese ripening, whereas a starter composed of *S. cremoris* + *S. lactis* subsp. *diacetylactis* was least effective. The procedure recommended for the manufacture of Camembert cheese with low *E. coli* content includes preacidification of milk to pH 5.9 by addition of 1% *S. cremoris* during concn. by ultrafiltration, and rapid reduction in pH to ≤4.8 by addition to the precheese mix of a combined culture of 4% *S. cremoris* with 0.5% *L. helveticus* or 1% *L. bulgaricus*. MEG

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[Effect of starter quantity and culturing temperature on multiplication of coliforms and heat-stable lactobacilli in skim milk.]

Koroleva, N. S.; Larchenkova, L. P.

Molochnaya Promyshlennost' No. 12, 40 (1981) [Ru]

[Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

0.5, 1, 3, or 5% starter *(Streptococcus lactis* + *S. acetoinicus*, or the so-called Kaunas starter consisting mainly of *S. cremoris)*, a culture of *Escherichia coli* at tens-hundreds microorganisms/ml and a culture of thermophilic lactobacilli at 10^3–10^4 microorganisms/ml were added to pasteurized skim milk and then incubated at 22°, 25°, 28° or 31° for 24 h and levels of *E. coli* and lactobacilli observed. The culturing temp. and amount of starter had a greater effect on multiplication of the microorganisms than the type of starter. *E. coli* multiplied only to the moment of coagulum formation (pH 5.0–5.2) irrespective of temp. and starter quantity. Multiplication of the lactobacilli took place throughout the incubation period, increase in temp. causing more intensive growth in the presence of 0.5–1% starter before coagulation, and in the presence of 3–5% after coagulation. SKK

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